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SOMATIC DEVELOPMENT, A CRITERION OF MENTAL MEASUREMENT

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Introduction

A popular philosopher has said: "The future is for those who can overwork." However trite the expression, it is nevertheless significant, involving as it does a consideration of the capacity for overwork, the ability to maintain indefinitely a terminal stimulation without dissociating cerebration. Its importance from a social standpoint, if one measures the significance of quality with quantity as primal factors in the mental development of mankind, was of primitive recognition, dominating the development of the gregarious instinct. A return to this atavistic attitude is the basis for the development of a race of super-workers.

Need of Adequate Measure

In order to determine the capacity for overwork, one must have a measure of mental capability, a quantitative standard of known exactness. Such a working hypothesis has been attempted with more or less success from a psychological determinism. The development, however, of a unit measure from psycho-genetic phenomena alone would seem illogical, and the variance of results obtained from its use indicates an inadequate structure. The attempt to apply to subjective states a series of objective terms, not all of which conform to psychic manifestations, has resulted in a dissociation of the embryological continuity of mind and body. A consideration

of neuronic integrity involves the microscopic examination of anatomical structure, but even more a correlation of physiological, interglandular activities quite alien to the immediate area involved.

Verworn has well conceived the fallacy of an endeavor to explain a process in general by seeking for its causes when he says: "The cause being found, the process is considered as fully accounted for. As if such a complicated process as development could be explained by a single factor."

Relation of Factors in Development

An adequate analysis of the quantity and quality of mental capacity must always examine the relation of anatomical, physiological, genetic and environmental factors, the phenomena, so to speak, of a human biology. With the aid of this objective investigation, it is possible to discover the significance of laws which empirical observation has shown to exist in abnormal personalities, to interpret the differences, and to explain the genesis of certain psychic tendencies and of special peculiarities predominant in the various types of mentality. Binet, in his pioneer investigation of the problem, recognized this tendency to incompleteness. "It should not make us forget," said he, "that there is another, the physical examination." Attention is fixed so engrossingly upon one organ that general principles are lost sight of, their place being taken by inflated particulars.

The only method of dealing with this narrowness is to look at the subject from the broad aspect of genetic and general biology. Nevertheless, many examiners of school children, of mental defectives and moral offenders, justify the results of their classification of intelligence by the use of a psychological test, which they wield as a complete armament rather than as an element of equipment.

Nor is this tendency, it must be confessed, confined entirely to the field of psychology. Certain observers have advocated a grading of intelligence on the basis of anatomical structure alone, others on the basis of a physiological development, still others have been quite as insistent on the potency of anthropometric results. The truth is that a complete examination exacts toll from various laboratories.

A technical efficiency is demanded in the various fields which render our analysis more searching, whereby it may be possible to predict more intelligently the correlation of somatic and psychic decadence. The examination of perfectly healthy children in public elementary schools will often reveal the presence of so-called stigmata among the mentally

alert, and the ament is often an animal of physical health. The development of a series of norms from the inexhaustible clinical material yet untouched in the fallows of the public school is the first step in rendering possible a more adequate method of judging the quality and quantity of intelligence.

Term Somatic Defined

In order to indicate their specific nature, advocates of various tests have devised the terms "anatomical age," "physiological age," "anthropological age," etc., to distinguish their method from the "psychological" or "mental" test.

Accuracy in scientific terminology is of more than academic interest and justifies the importance of noting that no one of these designations expresses the whole truth.

There is need of a concise term to indicate the cognate factors in the development of a composite, biological examination of the child. Such a term is somatic, not restricted to its anatomical or physiological use, but conforming more nearly to its primitive significance.

Such a designation converges the fundamentals of the several tests already noted along with others of embryonic and genetic importance. Moreover, these may be compared with psychic structures, and with the two expressions one has a comprehensive classification for all subjective and objective phenomena.

Factors Involved in Somatic Examination

A systematic examination to determine a child's somatic development should begin with a consideration of his genetic history, for here is displayed the promise of future mentality. Disorganization of the germinal structure, an unfavorable environment under which conception was promoted, abnormality of prenatal growth, premature birth, all tend to the production of embryological disharmonies which may persist for years and only emerge through the slow processes of growth.

In an objective sense these physical imperfections bear a striking resemblance to the subjective phenomena of the infantile complex in mental pathology.

There is a distinct continuity of embryologic associations from the cradle to the grave. Sir James Paget, recognizing this, said: "A slow time rate is often observed in children who are prematurely born. Facts relating to delayed growth often cause chronometric errors of grave importance. I venture to think that our practice would be improved if local defects of working power were more often thought of as errors in the time rate of life in the defective parts."

Biological Consideration of Growth

Recent investigations in the phenomena of growth tend to strengthen still further the mechanistic conception of life. Indeed the aim of biology may well be conceived as an attempt to make a perfectly clear working hypothesis of the peculiar phenomena of growth that are due to the play of physical and chemical environmental factors on intra-protoplasmic mechanisms. A pertinent instance is found in the purely physical causation of the decussation of nerve fibres and again in the development of the lymphatic system from vascular anlagen in response to budding bio-chemical irritation.

One of the fundamental problems of growth therefore relates to the action of external stimuli upon normal development. Is the fertilized ovum to be regarded as a composite structure, made up of various chemical anlagen distributed throughout the cytoplasm in definite positions, or is it a unicellular organism with ability to elaborate ferments at the successive genetic stages required for its complete development? The former hypothesis presupposes the embryonic parts, prelocalized in the cytoplasm, appearing as differentiation progresses. The latter supposition presupposes no differentiation of parts, the various regions of the cytoplasm being of equipotential value.

Although there are many linking factors associating the developmental processes, and one must consider the general physico-chemical factors underlying all growth, the fact is nevertheless well established that structural differentiation is dependent upon a series of complex and progressive oxidizations. In the later stages of development we are dealing with an organism whose chemical constitution is radically different from that of the primitive ovum and whose structure demands a supply of various chemical substances for its appropriation. Most of the developmental defects in the embryo are due to disharmonies involving its differentiative stage and only secondarily to defective growth phenomena. Bearing in mind then the chemical modifications occurring during the differentiating cycle of the embryo it is fair to assume that at certain specific times in the genesis of the anlagen their chemical composition is such as to render them more ready participants to the action of chemical reagents. It must be demonstrated, however, that the inhibiting action was exerted upon the undivided egg, the proanlagen, and not upon the anlagen or chemically complete ovum. Only by this method can we determine which is the true hypothesis. It seems possible that the human ovum requires little else than a sufficient supply of oxygen for normal differentiation during its early stages of development and that an insufficient supply would result from

an imperfect imbedding of the ovum in the uterine mucosa. It therefore seems probable that certain organic disharmonies, such for example as spina bifida in man, might find their explanation in faulty oxidation. We are therefore justified in concluding that the causative factor is exerted in the production of unfavorable reactions on the enzymes of the egg rather than by a specific action of the agent itself. An area of altered protoplasm resulting from reaction to irritants serves as a mechanical check to the approximation of the lips of the blastopore during the backward progression of the later and an abnormal condition of organic structure results. The importance of synchronized tempo in the processes concerned is strongly emphasized.

The results of biological investigations of growth indicate however that development, in multicellular organisms and their egg cells, requires other factors than the simple assumption of synthetic ferments or mechanisms. The immortality of such cells can hardly be assumed when one is obliged to rely upon the processes of fertilization or upon parthenogenetic methods to keep them alive. In spite of its potential immortality the unfertilized egg is doomed to die.

Growth embraces not only a relation to nutrition but also to stimulation. The cell and the crystal show similarities in development. Under favorable conditions both are able to increase in size yet one is able to evolve a composite structure from various split products while the other can only react in a supersaturated solution of its own substance. Consequently in a study of the cell it is not the increase of mass alone but the mechanism of growth that must be investigated.

The size of the egg cell is probably always greater than the corresponding somatic cells, therefore primary mitosis does not result, so far as may be seen, in an increase of structural size. The cells resulting from this division must first regress to the size of the somatic cells appropriate to the species before the usual cycle of secondary growth can begin. In all probability growth does occur, but it is qualitative rather than quantitative in character. The potential activity of the cell is maintained, but in a resting state, till fertilization takes place. The mechanism whereby development is inaugurated seems to result in an alteration of the surface layer of cells. This consists, partially at least, in a membrane formation induced by the influence of some cytolitic agent acting upon the cortical layer of the egg and resulting in an increase in the rate of oxidations within. There is an individual immunity against the automatic action of lysins against their own germinal cells else each animal would induce a development of all its eggs before they leave the ovary. It is nevertheless

possible that cellular permeability may at times induce parthenogenetic disharmonies in the development of certain spontaneous, ovarian tumors and similar somatic structures. The important fact to be noted is that this alteration is to some extent reversible. When the egg cell is reverted to its proper somatic size it is ready for fertilization. If this occurs, development in size progresses, otherwise the egg will, under ordinary circumstances, soon die. However, an important possibility may here intervene. The unfertilized egg may start to develop, then stop and revert to its former stage save that we have now, in place of the original egg, two, four, eight, etc., smaller cells. In spite of the fact that they possess the apparatus for normal cell division these eggs revert into the resting stage although they may be later fertilized in the usual manner. The interesting question here suggested is what caused these eggs to go back to the resting stage? Loeb believes that it is due to a sudden reversion of the change in the cortical layer accompanied by a reversion in the rate of oxidations. Thus its ability to alternate between a resting and an active condition might imply the egg's immortality. But does this satisfy the facts respecting the somatic cells? Before the egg is mature its duration of life seems longer yet it is not known that a similar condition exists in the case of other forms of cells. Consequently we must admit that the resting somatic cell is not comparable in this respect to the unfertilized egg.

We know, however, that resting somatic cells may be induced to grow by the action of certain specific substances circulating in the blood and that this action takes place independently of the central nervous system. The action of such substances as the secretion of the thyroid and pituitary glands and of the corpus luteum indicate that specific substances induce growth of special parts of the body rather than of the whole body. How this is brought about, whether by a condition analogous to the cortical layer of the germ cell we do not as yet know. The idea that the products of internal secretions act rather upon the cell through its metabolism than directly is strongly supported by experimental data. The presence of lymphocytes has been indicated also as a definite inhibitory factor in certain aspects of growth. In many lower animals and in plants whole organs may be induced to grow as a consequence of mutilation, some however being influenced more directly than others. Loeb is inclined to attribute both the inhibiting and accelerating effect to phenomena of agglutination which exist between the transportation of special material and the localization and inducement to growth, the mutilation leading to the gathering of elements in spots where without the mutilation they would not have collected.

Embryological Consideration of Growth

As the embryonic structures which constitute the animal body become differentiated into distinct tissues, the animal as a whole becomes more highly organized. The fundamental tissues, epithelial, connective, muscular, and nervous, exhibit one or more characteristics of protoplasm developing special functions, whereas other characteristics are lacking, or are less evident. The combined activities of these differentiated tissues are exhibited in the life history of the entire animal. For the understanding of this structure it is important to know the proportions of the several elements of the tissues, thus differentiating the particular tissue and the variety of animal.

A comprehensive knowledge of the child shows that one tissue system varies in a definite relation to another or to other systems. The muscles of the face, scalp and external ear, for example, are peculiar in that they are the physical basis into which many mental states are reflected and in which they are realized. Through them mental conditions are manifested. It is found that the differentiation of these muscles, from the so-called platysma sheet, into well-marked and separate muscles proceeds simultaneously with the development of the brain. The more highly convoluted the brain of any primate, the more highly specialized are its facial muscles.

The correlation between retrogressive development of the external ear and of the hard palate, which some investigators have attempted to prove, is but the reflection of a general incompleteness in the fusion of processes arising from the mandibular and hyoid arches.

A knowledge of the transformation of the foetal to the adult pharynx is of the utmost practical importance. It not only explains the occurrence of pathological conditions, but accounts for phenomena throwing light on the nature and anomalies of the thymus, thyroid and tonsil.

This brief epitome from the point of view of the embryologist is sufficient to indicate the character of structural differences presented in this most prolific field, a survey of which would tend toward an early and more complete understanding respecting the results of further tests of mentality.

Physical Consideration of Growth

It is a well-known fact that the growth of an animal in weight or linear dimensions does not proceed with uniformly retarded or accelerated velocity from the moment of its inception until the period of its completion. On the contrary, growth will at first take place relatively slowly, then more

rapidly and then again more slowly, thus yielding an S-shaped curve of growth. Two or three of these sigmoid curves may be superimposed upon one another in the complete curve of the growth of an animal. Robertson has suggested that the period of growth covered by a single curve should be termed a growth-cycle. The extra-uterine growth of man consists of two growth cycles and a fraction of a third, the inception of which occurs during the period of intra-uterine growth. There are therefore, in the normal development of man, probably four growth-cycles included in the intra- and extra-uterine stages:

I. Very brief "autostatic," probably preceding implantation of the embryo.

II. Lasting from the beginning of development until nearly the end of the first year of extra-uterine life. Maximum velocity at 1.66 months in males, and 2.47 months in females, "autokinetic."

III. Starting during or close to the completion of the first year of extra-uterine growth and partially fusing into the succeeding cycle. Maximum rate at about 5.5 years in both sexes, "autostatic."

IV. Maximum velocity at about 14.5 years in females and 16.5 years in males. Culminating on the attainment of adult weight. Probably "autokinetic."

When we apply adult standards of measurement to children we are faced with the fact that, even if we succeed in measuring their present powers, we are still a long way from being able to estimate their latent ability for the forces of growth in the mental and physical development of the child are both hidden and often incalculable. An attempt to determine this physical force in terms of a formula which should express the relation between height, chest girth and weight was attempted in 1900 by Pignet. This formula consists essentially in an expression of the numeral obtained by subtracting the two numbers representing chest girth in centimeters and weight in kilograms from the numeral indicating the height in centimeters. This result, in the absence of organic disease, seems to bear a constant relation to bodily vigor.

An effective method of detecting departures from normal growth has been devised by Hawkins and is largely used in English schools. To obtain this 40,000 measurements of height, weight and chest girth were collected. These were grouped into proper ages of six months interval from ten to eighteen years. Each group was separated into twenty divisions so that each division represented 5% of the total meas-

urements for that age. These were therefore 5% of all the boys of that age who were of that particular height, weight and chest girth. Each of these divisions was then named as grade 1, 2, 3 * * * 20, and each boy was referred to the appropriate grade to which his height assigned him. An opportunity is thus given of grading each boy with his fellows of equal age. If he is not normal and his weight does not correspond with his height his grading in the three qualities will not correspond. He may be among the tall boys for height and not among the heavy boys for weight. If measurements be taken at successive periods of life it is possible to note whether the boy remains at one particular grade in his height, weight or chest girth, at 12, 13, 14, etc. It can also be noted whether his weight or his chest girth, which was at one time in proportion to his height, begins to fall off at 16 and 17. The great value of this method comes out when one estimates the stress of school life during adolescence.

" It is essential to have clear ideas of the width of the physiological range that exists in the development of the neuro-muscular system in different individuals, quite apart from the pathological results of past disease and ill-health. There are practically three natural physiological types of development of the neuro-muscular system.

" 1. Adapted for the exhibition of massive weight. The whole physical frame here is very big. The large muscles of spine, shoulder, hip and thigh, neck and upper arm are coarse-fibred and well developed. The movements are frequently slow, but they give one the impression of considerable power. This condition may occur both among the dull and the clever boys.

" 2. Adapted both for bodily agility and bodily strength. The bodily frame here is often less massive in build, though large and well knit. The muscles of upper arm and shoulder, though not big, are still well developed and full of tone, and are fitted for rapid and effective action. The neck is long and thick and well set on the trunk and the body held very erect. The chest, though not necessarily deep, has wide range of action; the difference between inspiration and expiration may be as much as 4 or 5 more inches. Such a boy is a born boxer, swimmer, runner, or athlete, and will develop in any direction he chooses to train his powers.

" 3. The third type needs particular care and supervision during school life if he is ultimately to put forth his full innate powers. The larger limb muscles and the bony framework are comparatively feebly developed. The nervous energy, though it may be very considerable in amount, is irregularly distributed, and tends to manifest itself either in some special

handicraft or in some special intellectual channel, such as great language facilities, or its near ally, the mathematical faculty, or great imaginative faculties. Here we need constantly to distinguish between sustained strength and short-lived excitability, for, with rapid expenditure of nervous energy, rapid exhaustion is apt to set in. The sense of fatigue that should precede exhaustion and warn us of its near approach is apt to be absent. Owing to the small size of the bodily muscles these children make a poor show when tested by nutritional standards or by standards of bodily physique. To understand them properly we need to remember that though their intelligence or their dexterity is well in advance of their fellows, yet other parts of their physical frame are often behind."

Periods of Growth

To determine the normality of physical growth the four following periods should be studied in detail: the first year, the first to the seventh year, the seventh to the thirteenth year, and from the thirteenth to the eighteenth year. The first year, being the nursing period, is burdened with the results of mental emotions affecting the mother's milk. From the first to the seventh year, a child is predisposed to diseases of the nervous system and should be watched particularly at the periods of weaning and dentition, and for intestinal worms, and convulsions. The period from seven to thirteen years is noticeable for the appearance of chorea and other rheumatic manifestations and physical overstrain, while the period from thirteen to eighteen, being that of puberty, is of equal importance.

A number of investigations have been made to determine the alternation in periods of development of the various parts of the body.

It seems to be generally held that there are one or more periods of acceleration alternating with periods of retardation in the development of each structural unit of the body. The periods of acceleration in the development of one structure may be synchronous with the periods of retardation in the development of another, and the two may be called complementary structures.

Each organ or structure has a critical period when it is developing most rapidly and when it is probably most susceptible to its environment.

Bodily growth should always be determined from a consideration of growth of the part in respect of its previous size, its growth compared to the adult structure, and its growth in relation to total individual growth.

In a consideration of development laws should be generally applicable to all members of the species. Yet inasmuch as certain parts may be pathological, for example the brain in man in its relation to other forms and to evolution, it is frequently necessary to modify morphological criteria in their application to human structures.

Respecting the growth cycles in the human child, there is no indication, according to Robertson, of more than one such period during intra-uterine life subsequent to the implantation of the ovum. This is interrupted by birth when not half completed and culminates at the end of the first year of post-natal life.

The first period of post-natal growth, according to Bean, is associated with a rapid development of the trunk and extremities. This is followed by the eruption of the temporary teeth associated with the rapid development of the brain. This reminds us of the development of the trunk in the first month of pre-natal life, followed by the rapid development of the head. Between the arrival of the temporary teeth and the second acceleration of growth in stature, the heart and kidneys are apparently developing most rapidly. The eruption of the first permanent teeth, followed by the third acceleration of growth in stature, is related to the post-natal development of the liver, stomach, and intestines. The third period of rapid tooth development, followed by the fourth period of rapid growth in stature, succeeds this and precedes puberty, after which the growth of boys is retarded and the growth of girls almost ceases.

A presentation of the supposed causes of alternation in development would be incomplete without suggesting the influence of mechanical factors and the internal secretions. The ductless glands play such a part in development that if the normal effects of the secretions may be inferred from their abnormal effect, this factor is of primary importance in any somatic investigation.

Influence of Ductless Glands on Growth

By studying the results obtained in cases of excessive action of the ductless glands it is possible to arrive at some conclusion as to their normal effect on processes of growth and development.

Those who approach the subject from the laboratory side, however, tend to lose themselves in the mazes of abstract science; those from the hospital side tend to come prematurely to conclusions which are not scientific. It is probable that though the ductless glands are of great importance they are

only a part of the machinery of development. The inhibition or reinforcement of such correlations of the body as are carried on through the medium of chemical secretions or hormones has nevertheless exerted a wide influence toward a more scientific consideration of somatic adjustment and mental functioning.

"We find that by virtue of their secretions, or in some more cryptic manner, these glands preside over certain correlations of the body. These correlations are by no means rigid, but are, indeed, exceedingly variable, and this variability is most apt to be shown when circumstances are abnormal. The adjusting mechanism of development is not only flexible, but is more or less reciprocal, so that a ductless gland both influences development and is itself influenced by the changes of general development.

"In the harmony which is produced by the concerted action of the ductless glands we have reason to suppose that the leading part is played by the thyroid. This supplies a stimulus for the metabolism of the body as a whole. During infancy and childhood, when it is most important that the fires of metabolism should be controlled, the influence of the thyroid is checked by the thymus gland, by the lymphatic system in general, and perhaps by the pineal gland. These also bring about that delay of sexual activity which is so essential to the proper maturation and stability of the somatic faculties. Probably the first to break through this cordon of conservative influences is the adrenal system which awakens the dormant sexual organs and hastens the growth of the muscular and skeletal systems. At about the same time the skeletal system is still further stimulated by a secretion from the pituitary gland. This secretion quickens the development of every organ in the body, including the sex organs. These latter now ripen apace, and assisted by the combined action of the ductless glands, some animating, others restraining, carry the development of the body in waves and tides to its flood."

Relation of Physical Anthropology to Subject

We must conclude that a study of the physical anthropology of children is also of the greatest importance for a knowledge of the conditions and laws of growth under varying conditions of environment. The difference of city and country form of population, the difference of American and European children, and the difference of type in various parts of our country is most striking. These problems are of great importance for the teacher because the functions of any organ and

also of the whole body are so closely related to its development and form. The nature of these correlations is by no means clear, but remains largely a matter for investigation. Nevertheless, its existence can not be doubted.

Axel Key found that the liability to sickness decreased with increase in growth and *vice versa,* so that the one may be taken for a measure of the other.

The first step to be taken in researches of this character should be the study of the growth of individual parts of the body in connection with their functions. The growth of the hands and strength, the changes in curvature of the skull, the relative development of face and head are among the most important.

Development of Nervous System in Relation to Somatic Structures

The stability of the child's nervous system may be estimated by the ease with which organic structure complies with established norms.

Abnormal conditions of the skeleton occur with extreme frequency in conditions of amentia, ill balance and semi-responsibility. The number of such children who do not present one or more well-marked organic anomalies is small.

As an example, one may consider the growth of the ears which alter slightly in shape as the child develops his bodily and mental features. An infant may be identified by its ears with the greatest ease for at least two years. After this, they gradually alter, more often in the actual shape and size of the pina than the way in which the rim is folded over.

The ear also shows the traits of the child's mental quality, and there seems to be a distinct correlation between its development and right and left-handedness.

Observations made on the ears of 200 abnormal subjects by MacAuliffe and Marie gave the following frequency of departure from normality:

Left ear	Stigmata	Right ear
10 times	Darwinian nodosity	7 times
17 "	Auricular separation	19 "
12 "	Transverse lobe	18 "
21 "	Separate lobe	40 "
32 "	Fold of antihelix convex	37 "
10 "	Tubercle of supratragus	11 "
20 "	No superior bend	23 "

Ears presenting two stigmata 25 right.
Ears presenting more than two stigmata 35 right
Ears presenting two stigmata 26 left.
Ears presenting more than two stigmata 22 left.

Formula for Determining Weight of Nervous System

Donaldson has attempted a suggestive test for comparing the weight of the nervous system with body weight by a formula constructed so as to express the normal changes in the weight and length of the body as related to the weight of the nervous system. For this purpose, frogs were used, but the results are said to be applicable to other vertebrates.

Sources of error to be avoided are limitations of size on account of which the nervous system bears a precocious relation to body weight and nutritive conditions of environment.

When proper conditions are fulfilled, results are determined with a high degree of accuracy. The weight in milligrams of the central nervous system, according to this formula, equals the log. of the weight of the frog in grams multiplied by $\sqrt[4]{L}$ when L. = entire length in millimeters multiplied by 30, a constant peculiar to the species. This constant differs with different species and varieties, and represents in the bull frog 1/30 of the observed weight. In other words, it represents the denominator of the number obtained by multiplying the log. of body weight by the fourth root of body length which was nearly a constant fraction of the observed weight of the central nervous system, and could, therefore, be made equal to the observed weight by multiplying it by a constant factor having the value of the denominator of the fraction.

In these experiments, the calculated results were almost identical with the observed weights.

School Progress and Physical Growth

Shoemaker has pointed out how valuable from the standpoint of efficiency a regular weighing of children, in the schools, would prove, since all healthy children gain weight, and failure to do so should at once lead to investigation.

A study of physical growth and school progress by Baldwin is also indicative of the value of carefully conducted tests to determine height, weight, and lung capacity.

A number of valuable conclusions are drawn in this report, and a very thorough summary from an historical standpoint is given. The general conclusion is that if pedagogical age be accepted as a fair equivalent to mental development, the tall, heavy boys and girls with good lung capacity are older physiologically and further along in their stages toward mental maturity, as evidenced by school progress, than the short, light boys and girls.

It is further suggested that chronological grading be supplemented by the more logical method of physiological grading. "For a complete and comprehensive system of mental

tests to be used as a measuring scale of intelligence, it will be necessary to go further and supplement the psychological tests and include the essential criteria for determining the physiological age of the child. We have now reached a stage in our knowledge of child development when we can begin to search intelligently for these physiological criteria in order to formulate more adequate tests as measuring scales for intelligence and school standing. The grading of our schools must be adjusted to fit the mental and physiological age of the child in the place of its chronological age which is but fairly representative of the other two ages." Bolton has pointed out that the child's intellectual development depends more upon his chronological age than upon his mental superiority and Meumann has suggested that physiological age prescribes a definite limit which the memorial efficiency of even the intelligent child can not transcend, and that older children excel younger children simply because they are chronologically older.

Types of Mankind

From the standpoint of the biologist, Bryant's recent study of mankind considering nutritive idiosyncrasy, promises not only speculative considerations but also highly practical results. According to this theory, bodily form and intestinal length are correlated.

The genus homo is divided thereby into three classes: the carnivorous type, the herbivorous type, and an omnivorous type, the latter being omitted from this consideration as it includes individuals made up of the two factors in normal proportion and consequently healthy.

Inasmuch as medical investigation deals largely with abnormals, who require special care for maximal efficiency, variations of the terminal groups alone are contrasted.

Animals predisposed to one or the other of these extremes of food habit may within wide limits, when forced by necessity, reverse their normal manner of life, thereby inducing inharmonious reactions.

The carnivorous type is distinguished by a long, thin body form and a short, simple type of intestine. The complexion is sallow, cheek bones prominent, eyes near together, ears and nose long and thin, chin pointed, neck long, prominent Adam's apple, sloping shoulders, narrow costal angle, long waist, narrow hips and long extremities. Such is the quick thinking, quick acting, quick eating, high-strung individual with slow pulse, low blood pressure and subnormal temperature. This type would appear to be a negative organism, an inferior or very highly specialized type, in which the only

systems developed or remaining present in excess are those necessary to the perpetuation of the species—the central nervous and reproductive systems. This type seems to reach a more advanced age though it is more subject to such childhood diseases as carbohydratic intoxication and gastro-intestinal symptoms, tuberculosis, and in general diseases of ectodermal structures, that is, of the respiratory, digestive and nervous systems.

On the other hand, the herbivorous type presents a marked contrast. The body form is short and thick, the intestine long and complex. This is the slow thinking, easy going, slow eating individual with high pulse rate, blood pressure and temperature. He is shorter, heavier, of rosy complexion, round head and face, widely set eyes, ears thick and wide, nose flat and wide, chin and shoulders square, neck short and thick, wide costal angle, barrel chest, short waist, broad hips, wide, straight back and short, thick extremities. This type is a positive organism and is subject to diseases of mesodermal structures—the gall bladder, liver, arteries and cardio-renal organization.

From the standpoint of the student of growth, the analyses here suggested present interesting fields for investigation.

It would be distinctly worth while to be able to suggest by mere observation of bodily type, before using instruments of precision, that a child might reasonably be expected to fall within a suspicious category, and the hitherto unexplained discrepancy between many abnormalities and environmental factors could be answered by the susceptibility of the individual type to the influences of that particular situation.

Study of Circulation in Growth

Studies of circulatory phenomena thus far undertaken are somewhat more suggestive than convincing. Minot in a study of growth quotes a series of observations made under his direction respecting pulse frequency and gives the following table of norms:

Age	Mean frequency, beats per minute
1-2	111
2-3	108
3-4	108
4-5	103
5-6	98
6-7	93
7-8	94
8-9	89
9-10	91
10-11	87
11-12	89

12-13	88
13-14	87
14-15	82
15-16	83
16-17	80
17-18	76

Pubescence and Mental Development

A study of "physiological age" by Crampton considering the phenomena of adolescence is of particular interest because of its influence as a pioneer work in stimulating more rational procedures in physical testing and in grading. The pubes with reference to its piliferous development is taken as a basis for record, although there is no one definite sign to distinguish those on the verge of pubescence from those who will be several years immature.

A complete absence of hair and an abundance of the same is easy to distinguish and to designate the child as a pre-pubescent or immature or as a post-pubescent or mature. But the process of acquiring this growth is slow and it is therefore necessary to establish a pubescent or maturing class. This class includes all who have anything more than an abundant lanugo and less than a very well-defined covering.

The period of puberty being the time of the greatest physical and mental change, when old landmarks are fading and new ones are eagerly sought, is the age most prone to maladjustment.

It is at this particular epoch that a correlation between physiological age and chronological age is of greatest value. It is now that accelerations and retardations in growth rates, asymmetries and anomalies in structure, budding of new functions, in the change from an asexual to a sexual life, are developing.

It is only by objective signs that we are able to define its presence; the mere fact of age in years is of little value.

The total normal range of puberty is about eight and a half years and the variability one and a half years.

The pre-pubescent period begins at birth and ends with the beginning of the post-pubescent or adolescent period. This transition is often gradual. It begins by an evident and rapid growth of fine hair about the pubes. This readily distinguishable mark characterizes the beginning of pubescence. The second period commences with a pigmentation of this exaggerated growth. The last period, ending pubescence and establishing adolescence, ends with the appearance of the kink or twist which is definitely characteristic.

Definite correlations of pubescence periods with scholarship, weight, height and strength have been established.

Crampton well sums up the value of this examination as follows: "The school rebel and truant is often the boy whose teacher is unable from lack of discrimination or from organized authority to meet the demands of his maturing instincts. His demands, his enthusiasms, have gone on in the race and have left him tied to the post from which he is bound to free himself by means often of a questionable nature."

Development of Teeth

In an exhaustive study, both original and historical, by Bean the teeth are considered the most convenient and exact means of determining relative development of the individual, physically and mentally.

This investigator groups his subjects into two divisions, the hyperontomorphic, identical with the Mediterranean type, and the hypoontomorphic or brachycephalic type. Precocity in the eruption of the permanent teeth is regarded as a sign of hypermorphism in which the teeth are undergoing retrograde metamorphosis because they appear early and decay early. Therefore precocious children, who comprise most of this type, should be shielded from injuries to the alimentary, respiratory and nervous structures, to the diseases of which they are specially prone. Backwardness in the eruption of the permanent teeth is a sign of hypomorphism. Consequently the hypomorph should be shielded from diseases of structures of mesodermal origin, the hepatic, renal and cardio-vascular mechanisms.

The time of the most rapid eruption of the teeth and the time at which a majority have erupted is the same, and may be called the physiological standard of the teeth. This is shown in the following table:

	Girls	Boys
First molars	6	6.5
Med. incisors	6.5	7
Lat. incisors	8	8.5
Med. premolars	10	11
Canines	10.5	11.5
Lat. premolars	10	11.5
Second molars	11.5	12.5

The eruption of the permanent teeth does not occur with the same rapidity at each age but there are waves of eruption of the teeth like waves of bodily growth although the two are not synchronous. The periods of acceleration in the eruption of the permanent teeth occur about the ages of 7 and 11 years. And the periods of retardation follow those of acceleration. It will be seen that the periods of acceleration in the eruption of the permanent teeth initiate or precede the periods

of rapid increase in stature. The eruption of the teeth through the gums is but evidence of their previous rapid development and there is doubtless a period of rest throughout the body between the periods of the rapid development of the teeth and the periods of rapid growth in stature.

Girls are more precocious in the periods of acceleration than the boys as well as in the average number of teeth at any age.

When the permanent teeth begin to erupt the lower teeth erupt before the upper in the first period of acceleration, the upper teeth erupt before the lower in the second period of acceleration, and the lower teeth again erupt before the upper in the final stages of eruption. The alternation in development seems to apply to abnormal as well as normal development.

The process of selection in evolution can not be passed over as a factor in the eruption of the teeth. The incisors and first molars develop early and are larger, following man's need of biting, chewing, gnawing and grinding essentials. The canines or the holding and tearing teeth are slowly retrograding. They develop late and are comparatively small. The third molars are also undergoing retrograde metamorphosis and the second molars erupt later than they once did.

From 7 to 14 years of age inclusive children above their usual school grade have 0.8 more teeth and children below 0.9 fewer teeth than children at grade. The difference is greatest at ten and eleven years when children above grade have 0.8 more and those below 1.5 fewer teeth than those at grade.

One of the most promising signs in distinguishing those on the verge of pubescence from those several years retarded is the eruption of the canine and second molar teeth.

This test should be of distinct value in the somatic examination for determining precocity or backwardness.

Development of Osseous System

Very important studies on the development of the bones of the hand have been made by Pryor.

In his investigation in bone development Pryor determined that bone deviations or variations are heritable. The presence of an abnormal condition is a family characteristic. It is far more so than a resemblance in features in that it will always be found in all the brothers and sisters. The starting point for congenital malformations evidently differs with the character of the deformity. When a condition is uni-lateral we can understand that the deviation may be purely embryonic. When it is bi-lateral, although it may not be symmetrical, it is evidently a heritable character, originating in the germ cell of one or both parents.

Pryor's Summary of Development is as follows:

Bone:

Os Magnum		
Fem.	Develops	during the 3-4th mos.
M.	"	" " 7-8th "
Unciform		
Fem.	"	" " 3-4th "
M.	"	" " 7-8th "
Cuneiform		
Fem.	"	" " 13-14th mos.
M.	"	early in 3rd year.
Semilunar		
Fem.	"	late in 3rd or early in 4th year.
M.	"	during the 4-5th year.
Scaphoid		
Fem.	"	about the 4th year.
M.	"	" " 6th "
Trapezoid		
Fem.	"	" " 4-5th year.
M.	"	" " 5-6th "
Trapezium		
Fem.	"	during the 4-5th year.
M.	"	early in the 8th year.
Pisiform		
Fem.	"	during the 9-10th year.
M.	"	" " 12-13th "

Starting from this basis Rotch concluded that during the development of the bones the epiphyseal line illustrates the relationship of the diaphysis and epiphysis to each other and to their surrounding structures. The epiphyses present a very definite anatomic appearance at different periods.

It is important to appreciate that the various epiphyses gradually appear and grow larger and larger according to the stage of development of the individual.

The wrist and hand seem to be the most practical anatomic parts for use as a general standard index on which to establish a classification based on growth in the grading of children.

The problem at once presents itself as a method of determining the normal development from birth to perhaps fourteen years of age.

In undertaking to classify the different periods of growth of early life on an anatomic basis which will be of practical school use, it is evident that some reliable anatomic standard should be readily obtained and should be determined in the living child with the least degree of complexity and in the most simple form possible.

For the purpose of obtaining a practical and rapid knowledge of the progressive normal changes which take place at different periods of child life, a practical and reliable index of development is represented by the hand and wrist.

It is fortunate that the carpal bones and the lower epiphysis of the radius and of the ulna furnish a progressive series of anatomic development year by year so that only in unusual cases will it be necessary to refer to the other epiphyses of the skeleton for the purpose of corroboration.

An interesting feature shown by the radiographs is the fact that hands may be long or short, broad or narrow and yet show the same anatomic development thus indicating their classification under the same group.

Again large bones do not necessarily imply advanced development.

It has also been noted that the normal appearance of the hands of boys and girls do not materially differ in this respect and that the left hand shows no marked differences in development from the right.

In order to represent this classification practically we should have before us pictures which represent the normal development of the special group in question and using this determine the child's anatomic age.

Conclusion

The preceding incomplete summary is suggestive, merely. Its object is to serve as a preliminary basis for the development of a complete, yet simple somatic examination for the use of directors of school hygiene. While this should supplement and precede the further psychological tests of mentality it could be used as a part of the semi-annual physical examination of public school children. In either case its results would offer data for a further consideration of the subject's physical precocity or backwardness and define the boundaries of his biological history.

EXPERIMENTAL STUDY OF DYNAMIC PERIODICITY AS INFLUENCED BY DIURNAL, WEEKLY, MONTHLY, SEASONAL AND YEARLY EFFICIENCY*

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I. Aim of the Present Research

This article deals with dynamic periodicity, the normal recurrence of maxima and minima in strength during the day, week, month, season and year. The effects of temperature, humidity and atmospheric pressure are treated in connection with climatic influences. To some extent, the problems of mental and physical fatigue, and physical inactivity are given a place. The aim of these tests was (1) to verify some of the experimental results of previous investigators and (2) to introduce a new method of studying this very interesting problem of periodicity.

* This article is a very brief summary of a thesis submitted in partial fulfillment of the requirements for the degree, Doctor of Pedagogy, in the New York University, School of Pedagogy, 1914.

II. Historical Sketch

There is a marked scarcity of data on the subject of dynamic periodicity. The problems and results of previous investigators throw some light, however, upon our own work. Regarding daily periodicity nearly all investigators have found both a morning and an afternoon maximum, with emphasis upon the morning crest, both for physical and mental efficiency: *e. g.*, Schuyten (20) found maximum points between 8 A. M. and 11 A. M., also between 2 P. M. and 4 P. M.; while the 2 P. M. record was greater than the 11 A. M. it was always less than the 8.30 A. M. record; Storey (21) found a rise until 10 A. M. or 11 A. M., followed by a decline until 1 P. M., which was followed by a rise until 4 P. M. and a drop until 6 P. M.; Marsh (15) found the daily strength efficiency low in the early morning with a rapid rise until 11 A. M., a level or slight decline until 1 P. M., and an increase with maximum at 5 P. M. and a decline until bedtime.

Regarding seasonal periodicity there is not so much agreement among authors as with daily periodicity. Schuyten and Peaks (19a) found a crest around December-January in physical strength; while Lobsien (13) and Peaks found the highest psychic capacity around December-January. Dexter (6, 7, 8) concluded that the time of year was not an important factor especially regarding misdemeanors. Schuyten found a decrease in the power to grip the dynamometer during both winter and summer and a rapid rise during spring and autumn. Peaks differs slightly at this point, finding the autumn rise to begin late and continue until January, and the spring rise having its crest in May. Dexter places much emphasis upon both barometric and hygrometric influences, especially the abnormal barometric influence. Lehmann and Pedersen (11c) conclude that both physical and mental work vary from day to day due to sunlight, temperature and barometric conditions. Huntington (11b) found that factory hands work fastest in November and slowest in January. Schuyten pointed out marked effects of temperature to which Lobsien added environmental conditions, especially geographical location.

With these points of emphasis in mind, we will proceed to the analysis of our own data.

III. Procedure

Most of my tests were made by myself. Others who acted as subjects were nine graduate students, two ladies and seven gentlemen, two girls (ages 12 and 14 years) and one high school boy (age 17 years). The study was thus an individual

one, which fact must be kept in mind when drawing conclusions. The Smedley dynamometer was used; and the barometric, hygrometric and thermometric readings were taken from the government reports. I began measurements, myself as subject, in the Laboratory of Experimental Pedagogy, New York University, November 13, 1912, and continued until April 1, 1914; then after 180 days rest, measurements were resumed again for 50 days and after an additional rest of 20 days, measurements were resumed for five days,—making in all 560 days upon which tests were taken. Six measurements, three with the right hand and three with the left hand, were taken at each of the seven different stated times, daily as follows: (1) 7 A. M. which was immediately after rising in the morning, (2) 9 A. M., the time between seven and nine being occupied by a bath, breakfast, a short walk and the morning paper, (3) 12 M., the time from nine to twelve each morning being devoted to study or spent in the lecture room, (4) 2 P. M., the time from twelve to two was for lunch, a walk, rest and the reading of a magazine, (5) 6 P. M., the time between two and six was for study or the lecture room (always one or two hours lecture during the University school years 1912-13 and 1913-14), (6) 8 P. M., the time from six to eight being occupied by dinner, rest and the evening paper, (7) 11 P. M., the time from eight being devoted to study. This program was adhered to with a considerable degree of constancy during the entire period during which tests were taken save that during the month of June, 1913, there was no study but tests were taken as on other days. The actual time of taking tests did not vary appreciably from the stated time, and at all such times a note was made of the amount of deviation.

The method of taking measurements was the same throughout the entire period, and for all subjects. At any one time, measurements were taken alternately with the right and left hand, which alternation caused the lapse of a few seconds of time necessary for the changing of the dynamometer from one hand to the other and tended to eliminate fatigue. During the tests the subject stood in an erect position and the dynamometer was held in the following positions: (1) with the arm in a downward position by the side of the body, yet not touching the body at any point, (2) in a vertical position, (3) in a horizontal position. In each of these three positions practically the same muscles are used, yet the fact that the position is different would tend to prevent fatigue. At each measurement an effort was made by the subject to exert all the energy possible, to grip his maximum. Although the dynamometer is intended to measure physical strength only, it is the writer's conviction after a long series of experiments

that the entire individual participates in every separate test taken, and that the results obtained are in a degree a measure of the entire subject.

The data, the summary of which is expressed in my results and from which I have drawn my conclusions, include 28,810 separate measurements.

IV. Results

1. Daily Periodicity

a. General.—By a careful study of the table, given below, of the general daily periodicity for the 505 days from November 13, 1912, to April 1, 1914, showing the arithmetical average, maximum, minimum, mean variation and median, one will note the following general trend in the curve of arithmetical averages: (1) a relative low measurement (43.33 kilos) for the early morning period, due doubtless to the fact that the tests were taken immediately after rising in the morning; (2) a rapid rise at 9 A. M. (46.59 kilos); (3) a slight drop at 12 M. (46.34 kilos); (4) a slight rise at 2 P. M. (46.44 kilos); (5) a broad level from 2 P. M. to 6 P. M. (46.44 kilos); (6) a rise at 8 P. M. (46.63 kilos) making not only the afternoon crest but the high point of the day; (7) a marked *drop* at 11 P. M. (45.26 kilos). This 11 P. M. measurement though indicating a decided drop (1.37 kilos) below the 8 P. M. measurement is higher than the early morning test by 1.93 kilograms. The median curve follows the average curve very closely, being a little higher at all points. The one marked variation is shown in the median measurement for 6 P. M. which is somewhat below the median measurement for 2 P. M. instead of being on a level with it as is the average measurement. The median curve which shows a morning crest at 9 o'clock, an afternoon crest at 2 o'clock and an evening crest at 8 o'clock is probably nearest to the true diurnal course of efficiency. The striking of averages, of a large number of measurements, tends to bring all to a level. This conclusion is strengthened by a consideration of the range of difference between maximum and minimum measurements and the mean variation. The range of difference between maximum and minimum at 12 o'clock is greater than at either 9 o'clock in the morning or 2 o'clock in the afternoon, greater at 6 o'clock than at either 2 o'clock or 8 o'clock and greater at 11 o'clock than at 8 o'clock. It is least at 8 o'clock in the evening (8.1 kilos), second lowest at 2 o'clock in the afternoon (9.3 kilos) and greatest at noon (14 kilos). The curve of mean variation though nearly straight is lowest in the forenoon and early afternoon and highest at noon and in the evening.

The very low measurement and the slight mean variation

for the 7 A. M. period are doubtless due to the fact that the tests were taken immediately after rising in the morning. In order to verify this conclusion tests were taken on 30 days at 7.45 A. M., which was after the necessary exercise required in making the morning toilet but before breakfast, with a resulting average measurement only slightly below the average measurement at 9 A. M. for the same days. The rise at each of the 2 P. M. and 8 P. M. periods is due in part to taking of food and rest. The afternoon is always better than the morning; the average and median being higher, the range of difference between maximum and minimum being less and the mean variation being the same; the evening is better than the afternoon; the average and median being higher, the range of difference between the maximum and minimum being less, while the mean variation is slightly higher.

The diurnal course of efficiency as indicated by the arithmetical averages, median, mean variation and maximum and minimum seems to have three distinct rises and an equal number of declines. This is true not only of the averages but of 69 per cent. of the 505 days included in the table.

Table for the Diurnal Course of Efficiency

	7 *a.m.*	9 *a.m.*	12 *m.*	2 *p.m.*	6 *p.m.*	8 *p.m.*	11 *p.m.*
Average.	43.33	46.59	46.34	46.44	46.44	46.63	45.26
Max.	49.00	50.60	52.00	50.80	50.80	51.10	50.60
Min.	38.50	39.00	38.00	41.50	40.80	43.00	40.60
Median. . . .	43.80	46.80	46.70	47.10	46.90	47.30	45.90
M. V.	1.50	1.70	1.80	1.70	1.70	1.80	1.80

b. Detailed.—A detailed study of the diurnal course of efficiency of the 505 days included in these tests reveals many interesting facts that are entirely unnoticed by a general consideration of arithmetical averages and mean variations. The day showing the highest average record was October 28, 1913. The record for this given in the regular time order for the seven periods was: 44.5, 50.5, 51.3, 50.1, 50.6, 50.6, 49.1. It will be noticed that the curve of this day is not that of the average day; instead there is a gradual rise until 12 M. when the maximum measurement for the day is made, a drop at 2 P. M. and another rise until 8 P. M. The curve for this day is characteristic of a large number of days upon which the subject was in the best of spirits, or when work was inspiring. Another group of days having a record very similar to the foregoing save that the afternoon record was comparatively low, was when work was interesting and a maximum of attention was given during the entire morning. The curve would gradually rise until 12 M. or perhaps 2 P. M. then drop and remain low for the entire afternoon and evening. The maximum grip, and maximum measurement for any one

period did not occur on either the day having the highest or next highest record, nor during the season when highest records were being made, nor at the time of day having the highest average record. The maximum grip (57 kilos) was made at 12 M. on January 6, 1914, and the highest record for any one single period (52 kilos) was made at 12 M. on January 4, 1913. Both of these records were made on days when work was inspiring, when the subject was at his best.

2. Weekly Periodicity

a. General.—In order to study the weekly periodicity the data for the 53 weeks between December 15, 1912, and December 20, 1913, were considered. From a study of the table given below it will be noted that: (1) the curve of arithmetical averages is nearly straight, (2) the median curve is more marked, (3) the maximum and minimum curves have the same general trend, (4) the difference between maximum and minimum measurements shows Monday and Thursday with the greatest difference and Wednesday and Saturday with the least, (5) Monday shows the highest mean variation and Saturday the least.

Table for Weekly Periodicity

Days	*Sun.*	*Mon.*	*Tues.*	*Wed.*	*Thurs.*	*Fri.*	*Sat.*
Average.	46.00	45.90	46.30	46.10	45.90	46.00	46.30
Max.	49.10	49.30	49.50	48.90	48.70	49.00	48.90
Min.	42.90	42.00	43.20	43.10	41.50	42.80	43.20
Median.	45.50	46.10	46.60	46.30	46.10	45.80	46.30
M. V.	1.53	1.66	1.43	1.34	1.36	1.53	1.33

b. Detailed.—By a more detailed study of the individual weeks included in the general study of consideration of averages and especially when the subjective notes are taken into account some points of interest are apparent. During the University school year it was found that the weekly curve followed very closely in its rises and falls that of days of most and least study. On Saturdays the most hours were spent in the lecture room. These were not low record days, however, but Fridays which were devoted to preparation for the Saturday lectures. The increased difference between maximum and minimum on Monday and Thursday, mentioned above, was due to a marked drop in the minimum curve for those days, and which is accounted for when the subjective notes made on those days are consulted. On the Monday upon which the low measurement was made, I had written, "No physical exercise to-day or yesterday; close application to work," and on the Thursday upon which the low measurement was taken I had written "Close confinement and intense study for several days." This accounts, in a measure, not

only for the increased deviation between maximum and minimum but for the low arithmetical average.

3. Monthly Periodicity

a. General.—A consideration of the curves for the sixteen months during which tests were taken in the first experiment, no distinctive characteristic common to all or a large percentage of the months is noted. A comparison of the several months reveals the fact that ten of the sixteen months (63 per cent.) have the same diurnal course of efficiency and that the curve for each of the ten months has the same general trend as the average curve for the 505 days included in the experiment. The curves for four of the remaining six months have the same general trend as the average curve and vary from it only in that the crests are at different hours of the day. Thus fourteen or 87 per cent. of sixteen months during which tests were taken have the same general trend, the M shaped curve for their diurnal course of efficiency.

b. Detailed.—For nine of the months the difference between maximum and minimum curves shows a decided decrease at 9 A. M. from that at 7 A. M., for eleven months there is a marked increase in the difference between maximum and minimum at 12 M. over that at 9 A. M., for twelve months there is a marked decrease in this range between maximum and minimum at 2 P. M. from that at 12 M., for eleven months there is an increase in the difference between maximum and minimum at 6 P. M. over that at 2 P. M., for eleven months there is a decrease in this range at 8 P. M. from that at 6 P. M. and at 11 P. M. ten months have an increase in the range of difference between maximum and minimum over that at 8 P. M.

4. Seasonal Periodicity

a. General.—In studying the seasonal periodicity I have considered (1) the curve of daily averages for the entire period of 505 days included in the experiment, (2) the daily mean variations and (3) the diurnal course of efficiency by seasons. From a consideration of the curve of daily averages for the entire period, it is evident that the portion representing the summer and autumn, June 21st to December 22nd, is more regular and at a higher level than the portion representing the winter and spring seasons. The curve for autumn is higher though not more regular than the curve for summer. This is best shown by a consideration and comparison in percentages of the number of days of each season that are below the average for the year. The average daily measurement for the calendar year 1913 was 45.9 kilograms, 68 per cent. of the days of the winter season were below this average,

80 per cent. of the days of the spring season were below this average, 26 per cent. of the days of the summer season and only 4 per cent. of the days of the autumn season were below this average. The beginning of the winter season is quite marked for both the year 1912 and 1913, there being a decided drop in the curve near the middle of December. There is no characteristic change in the curve at the approach of the spring season; the curve during the entire season being only slightly more irregular than the curve for the winter season. Between summer and autumn there seems to be no line of demarcation. If we were to consider the curve as represented by arithmetical averages only, there would be much more reason for dividing the year into three periods as suggested by Malling-Hansen, *i. e.*, from August to the middle of December, from the middle of December to the end of April and from the first of May to the end of July. The general curve becomes very regular about the first of August and continues in this way until the middle of December where there is a decided drop in the curve. From this point on the curve continues at a decidedly lower level and somewhat more irregular to the first of April. Between May 1st and August 1st the curve is slightly more regular than the previous period.

A careful study of the data for the 505 days included in the first experiment brings to light a marked difference in the diurnal course of efficiency as indicated by the mean variation for the different seasons. During the winter season the curve of mean variation on 65 per cent. of the days was that of the letter W, during the spring season 51 per cent. of the days, during the summer season 31 per cent. and during autumn 41 per cent. of the days. The characteristic curve for the summer season was that of the inverted letter U, *i. e.*, there was a gradual rise in the mean variation from the morning period until 2 P. M. or 6 P. M. then a gradual drop to 11 P. M. During spring and autumn the days are nearly evenly divided, and seem to alternate between the two forms. This is not surprising when we remember that spring and autumn are transition seasons between the colder winter and warmer summer. During the summer when the diurnal solar control of climatic conditions is strongest there is a gradual rise in the mean variation of the dynamometric measurements taken at the respective periods of the day up to 2 P. M. or 6 P. M. with a drop to 11 P. M. During the winter when the non-periodic cyclonic element controls the weather the diurnal course of efficiency as expressed by the mean variation of dynamometric measurements is of a very different character. There is a drop at 9 A. M. from that at the early morning

period, a slight rise at noon, a drop in the afternoon and a rise in the evening. This would seem to indicate that during the summer season when climatic conditions are controlled by a periodic diurnal solar element, the subject gradually decreases in his ability to remain constant during the time required for taking the dynamometric measurements, according to previously described methods, as the day advances with the exception of the 11 P. M. period. This deviation may be accounted for by the fact that at this time the subject was fatigued and as will be pointed out later fatigue tends to increase the mean variation up to a certain point, but as fatigue becomes more pronounced the mean variation becomes less, or that the subject had been physically inactive for three hours previous to taking the 11 P. M. tests, and that inactivity lowers both the arithmetical average and mean variation. During the winter season when climatic conditions are controlled by a non-periodic element the subject's ability to remain constant shows effects of work, rest, the taking of food and recreation. That there is a definite causal relation between these two very interesting facts, the change of weather conditions caused by the predominating control of the solar or non-periodic cyclonic element and the mean variation in the dynamometric measurements taken during the different seasons, this investigation does not attempt to prove. Even should this relation be established for one individual far more extensive investigations would be necessary to establish the hypothesis as a law. If it is true, however, that during the winter season the currents of air that come from higher altitudes bringing ozone and a high electrical potential do stimulate man to the extent that he remains more constant at a given time of the day, increases his ability to concentrate as this investigation seems to indicate, it is well worth scientific investigation.

The seasonal variation as indicated by the diurnal course of efficiency for the five seasons studied differs from that of the average only in the location of maximum and minimum points and not as to general trend. In the relative difference between maximum and minimum curves all seasons agree with that of the average curve.

5. Yearly Periodicity

a. General.—In studying the yearly periodicity, I considered (1) the general trend of the daily averages and (2) the diurnal course of efficiency. The data for the first three months of the year 1913, January, February and March, were compared with those of the same three months of 1914. The general trend of the average curves for the two years is very

much the same. The January curve for each year is identical in general trend. For each month there is a rapid rise during the first four days followed by a gradual decline until about five days from the end of the month when there is a comparatively rapid rise, followed by an equivalent drop on the last day of the month. February for each year shows a gradual downward tendency in the direction of the curve. There is a close similarity between the curve of daily averages for March each year. Each curve is comparatively level up to the 21st day where each drops about 1.5 kilograms. From this day on to the end of the month there is a difference, the curve for 1913 continues at a lower level, while the curve for 1914 rises on the 23rd day to a higher point than that before the drop on the 21st day and continues on a higher level to the end of the month. In each case the curve for 1913 is more irregular than the curve for 1914, which is made more manifest by a consideration of the maximum and minimum measurements. For each month and for each period of the day the range of difference between maximum and minimum is greater for 1913 than for 1914. This variation is due in a measure to the fact that when I began acting as a subject my habits became more regular and fixed. An effort was put forth to have regular hours for meals, study and recreation. There was a definite time for rising in the morning and for retiring in the evening. An increased regularity in habits would doubtless bring about an increased regularity of results in the data collected.

A study of the diurnal course of efficiency shows January, 1914, only slightly different from that of 1913. The greatest difference is shown by the deviation between maximum and minimum, also the median curve which differed considerably from the average curve for January, 1914, while the two were nearly coincident for 1913. For February and March, each year, the median curve follows the average curve closely, the marked variation being in the fact that for both months the 1914 curve is considerably above that of 1913. The greatest variation is in the increased rise in the curve from 7 A. M. to 9 A. M. The 7 A. M. measurement for the two years agree within one kilogram, but the rise at 9 A. M. for February, 1913, is 1.9 kilograms while that for February, 1914, is 4 kilograms; the rise at 9 A. M. for March, 1913, is 2.6 kilograms while that for March, 1914, is 5.4 kilograms. There is very little difference in the general trend of the curve from 9 A. M. on to the end of the day save that for 1914 is at a higher level than that for 1913.

b. Detailed.—A study of the general trend of the curves and even a comparison of the diurnal course of efficiency by

months has a tendency to emphasize differences and minimize likenesses. A detailed consideration of the complete records for corresponding days in the light of subjective notes is very suggestive and essential in making a complete comparison. The marked difference between maximum and minimum was due to the slightly more varied or irregular curve for 1913 than 1914. This variation was much more marked for February and March than for January. During the last week of February, 1913, I had written, "It is very difficult to explain this week, unless it is the result of two weeks' close confinement with inadequate exercise." On the week beginning March 16, 1913, I had written, "A sudden rise in vitality, an increased ability to work but a decreased inclination." During the last week in March, 1913, I had written, "An aversion to study; can hold myself to work with difficulty." From the above, it is evident that the maximum of work was being attempted. This explains the wide range between maximum and minimum, and the fact that the average curve for 1913 is lower than for 1914. There was not so much work attempted during 1914 and it was accomplished under more ideal environmental conditions. A consideration of the month of January each year when the amount of work attempted and environmental conditions were similar reveals the following detailed records for the 7 A. M. tests for the first week in January each year:

1913.....	43.5	46.0	43.0	45.5	45.7	45.0	45.0
1914.....	43.6	44.6	43.0	44.6	45.8	45.0	44.5

A very marked resemblance is shown. The object in selecting the morning records is the fact that these are freer from accidental influences that might happen during the day, these tests being taken after a night's rest. Not all the weeks of the two months have so close a resemblance, however. For January, 1913, the maximum measurement was 54 kilograms, the highest daily average 48.9 kilograms, and the lowest daily average 44.5 kilograms. For January, 1914, the maximum measurement was 56 kilograms, the highest daily average 48.2 kilograms and the lowest daily average, 45 kilograms. As has been pointed out the maximum grip (57 kilos) was made at 12 M. January 6, 1914, and the best record for any one single period (52 kilos) was made at 12 M. January 4, 1913.

6. Individual Variations and Correlation of Tests

An opportunity for studying individual variations and correlation of tests was made possible by nine graduate students who kindly consented to act as subjects. One graduate stu-

dent who will be designated as Subject *R*, took tests at 6 P. M. each day from December 12, 1912, to May 26, 1913. The time at which Subject *R* took tests was the same as one of my own periods; further he had similar habits of life and was doing very much the same work at the University. The general trend of the two curves is the same, the curve of Subject *R* being slightly above my own. Each curve shows a slight rise up to the 1st of January and a downward trend through February and March, a slight upward trend in each curve to the 14th of April. From April 17th to May 23rd the curve for Subject *R* took a downward direction while my own curve indicates a rise. This downward trend in the curve of Subject *R* is doubtless due to the fact that during these days preparation was being made for the final examination for the Doctor's degree. On the three following days after the examination the curve makes a very rapid rise.

During the New York University Summer School of 1913 eight graduate students, two ladies and six gentlemen, consented to act as subjects for twenty-four days. Each subject took tests with the Smedley dynamometer, according to the previously described method, at 1 P. M. (the beginning of a lecture period), at 2.30 P. M. (the end of the lecture period proper) and at about 3 P. M. (or just after taking the Lough Association Test which followed the lecture period). Measurements were taken between July 5 and August 5, 1913. No tests were taken on Saturdays or Sundays. A careful consideration of the data reveals the fact that only three subjects show a decrease in their ability to grip the dynamometer on more than 50 per cent. of the days, two show a decrease on more than 50 per cent. of the days while taking the Association tests, four show a drop in the median measurement on more than 50 per cent. of the days during the lecture period, while only two show a similar drop during the time of taking the Association test. Two show an actual decrease in the difference between maximum and minimum on more than 50 per cent. of the days, while only one shows a similar decrease while taking the Association test. A very wide range of percentages, doubtless, indicate very marked individual variations.

7. Fatigue Influences

The marked drop in the curve of Subject *R* from April 17th to May 23rd, previously noted, was due not only to intense application while completing his Doctor's thesis and the accompanying mental strain, but to a lack of out-door exercise. It is interesting to note at this point, that the curve of Subject *R* took a sudden rise during the last five days and actually reached my own curve on the day before the experi-

ment closed though it had been nine kilograms below it on the 10th day of May. During these five days much time was spent in the open; there was no study and no mental strain.

Just how much of this effect was due to mental fatigue and how much to lack of physical exercise cannot be determined by the tests taken by Subject *R*. My own data furnish an opportunity to study this very interesting problem and throw some light upon the effects of both mental fatigue and physical inactivity. During the last week in February, 1913, and the month of March, I was doing the maximum of mental work possible as has been indicated by quotations from subjective notes. These weeks were characterized not only by a low daily average but the range between the right and left hand became much affected. In general my right hand is from 5 to 8 kilograms stronger than the left. It was during this last week in February, 1913, including the first two days of March that the left hand measurement equalled that of the right hand on thirty of the forty-nine periods upon which tests were taken. During the week beginning March 16, 1913, when I had written, "An increased ability to work but a decreased inclination," the left hand measurement equalled that of the right hand on only thirteen of the forty-nine periods.

An additional opportunity for studying the effect of lack of physical exercise is offered by the data for the month of June, 1913. During this month there was no study and very little outdoor exercise. As has been stated the curve for May, 1913, had a general upward trend which continued until the 6th of June, when there was a sudden marked drop which came after five days of inactivity. The curve continued downward until June 16th, when the average measurement of the day was 4.1 kilograms below the yearly average line. Five days of out-door exercise brought the curve up to the average line again on the 21st of June, but the following nine days of inactivity left the curve on the last day of June where it had been on the 16th. During the month of May the range of difference between the right and left hand measurements had become normal, and remained normal during the month of June. This would seem to indicate that physical inactivity produces a gradual decrease in the ability to grip the dynamometer, while mental fatigue produces not only noticeable deviations from the normal from day to day, but very marked fluctuations between the right hand and left hand. In other words, a period of physical inactivity is characterised by sluggishness, life at low ebb, while mental fatigue is accompanied by an inability to remain constant.

To test further the effects of inactivity, and lack of out-

door exercise and physical fatigue the following experiment was devised: (1) tests were taken with the dynamometer according to the previously described method by three subjects, Subject *Z*, a girl twelve years old, Subject *O*, a girl fourteen years old and myself, Subject *K*, (2) Subject *Z* took no outdoor exercise, but read, sketched or sewed, Subjects *O* and *K* spent much time in the open playing tennis or walking, (3) tests were taken at 8, 9, 10 and 11 A. M., at 12 M. and at 2, 3, 4 and 6 P. M. These tests were continued for seven days and from the following table it is noted that:

Subj.	8 *a.m.*	9 *a.m.*	10 *a.m.*	11 *a.m.*	12 *m.*	2 *p.m.*	3 *p.m.*	4 *p.m.*	6 *p.m.*
Z.....	15.0	14.9	15.7	15.2	15.0	16.6	15.7	15.2	15.6
O.....	16.9	18.8	20.0	19.4	18.1	19.1	17.9	18.3	18.3
K.....	45.8	47.7	47.9	47.2	45.6	46.2	46.4	46.5	46.1

(1) the curves of Subjects *O* and *K* are very much the same, having a high morning maximum and a much less pronounced afternoon crest, (2) the curve of Subject *Z* has a morning and an afternoon maximum, the afternoon being the more pronounced. This would seem to indicate that physical exercise in the open air tends to make the morning hours the better, while during days of inactivity the maximum measurement occurs in the afternoon. In the case of Subject *Z* the 9 A. M. measurement actually drops below the 8 A. M. measurement. This was also true on three different days of June, 1913, in my own regular tests when the 9 A. M. measurement was below the 7 A. M. measurement. It was during this month that little physical exercise was taken and almost all of the time was spent indoors.

An attempt was next made to measure physical fatigue. Two subjects, Subject *S*, a high school boy 17 years old and myself, Subject *K*, used a pulley-weight exerciser to produce physical fatigue. Each subject took six measurements on the dynamometer according to the previously described procedure at three minute intervals, the pulley-weight exerciser being used between times, and finally after ten minutes' rest. Subject *K* used the exerciser for five minutes instead of three on the first period. Both subjects were urged to put forth the maximum amount of energy in using the exerciser. The table given below shows for Subject *S* a slight increase in the dynamometric measurement after the first three minute period, but from this on there is a gradual decrease with the greatest decrease after the ten minutes' rest. It is noted also that the mean variation at this last measurement was small, from which it might be inferred that a small mean variation might be associated with physical fatigue as well as with a normal physical condition or physical vigor. Subject *K* shows signs

of fatigue after using the exerciser five minutes, and also at the end of each of the three minute periods, but after ten minutes' rest the measurement was higher than at the previous period. The records of Subject *K* show an increase in mean variation as fatigue increases up to a certain point then begins to decrease as fatigue becomes more apparent.

Subj. S	0 *min.*	3 *min.*	6 *min.*	9 *min.*	19 *min.*
Average.	35.5	37.3	36.6	35.6	33.8
Mean var.	1.5	1.3	1.4	1.3	1.1

Subj. K	0 *min.*	5 *min.*	8 *min.*	11 *min.*	14 *min.*	24 *min.*
Average.	49.0	47.6	47.8	47.3	45.8	46.6
Mean var.	5.0	5.5	6.1	6.0	5.1	4.8

Both of these experiments seem to confirm the conclusion reached above, that physical fatigue and inactivity produce a gradual decrease of physical strength, while mental fatigue produces a marked fluctuation in strength, or a lack of constancy.

8. Barometric Influences

An attempt was made to study the dynamometric data collected in the light of climatic conditions as indicated by barometric readings. My own data show a maximum at a barometric reading of 30.00 with a gradual decline on either side, but with marked fluctuations at the extremes of the curve. The curve for Subject *R* was similar save that the maximum was at 29.80. The barometric readings were not so high during the time when Subject *R* took dynamometric measurements as the period for Subject *K*. Of the eight graduate students, six show a maximum at 30.10, one at 29.90 and one at 29.80. The fact that six of the subjects agree as to the maximum point is significant, also that it is near the maximum point of Subject *K* whose data include all seasons of the year. Further, it might be added that the measurement for Subject *K* for the same days as those of the graduate students indicated 30.10 as a maximum. These variations would doubtless be less if all seasons were included in the data tabulated for each subject.

The season during which the highest dynamometric measurements were taken by myself was autumn. During this season 70 per cent. of the days had a barometric reading above the normal, 29.98, during spring, which was the low point in the curve, 55 per cent. of the days were above normal. During summer 55 per cent. and during the winter of 1912-13, 60 per cent. and during the winter of 1913-14, 63 per cent. of the days were above normal. This would seem to indicate that the collective influence of a large number of days as

indicated by seasons tended to strengthen the conclusions drawn above.

9. Hygrometric Influences

My own data indicate a maximum measurement upon days when the relative humidity was between 70 and 80 and second highest on days when the relative humidity was between 80 and 90. There was a very marked drop in the measurements for days having a relative humidity below 50. For Subject *R*, the maximum was at 80 and minimum at 30. Three of the graduate students had a maximum between 80 and 90, two above 90 and three between 40 and 50. Regarding the last two mentioned it must be stated that their second highest measurements occurred on days of relative humidity above 90, so that the high record was doubtless influenced by other climatic, physical or psychic elements. For the subjects studied, a relative humidity between 75 and 85 is probably most advantageous. The months August, September and October, months of high dynamometric measurement, had a relative humidity only slightly below 75. These months were characterized by a comparatively constant daily dynamometric measurement.

10. Psychic Influences

Under psychic influences there is no intention of entering into a discussion of the influence of mind over matter or *vice versa*. There were days when pure psychic influences entered, however, *e. g.*, on Saturdays during the University year 1912-13 the 12 M. tests were invariably higher than the 9 A. M. or 2 P. M. tests. The 12 M. tests were the maximum tests for these days. The 12 M. tests on these Saturdays were taken at 12.30 P. M., which might alter the records slightly, but on the other hand the time from 9.15 to 12.30 was spent in the lecture room taking notes. These very high records were influenced, we believe, by the fact that these three hours of lectures were very interesting and inspiring, and also because on these days a large number of students were in attendance at the University and especially the lectures referred to; in other words, my tests were influenced by an inspiring lecturer and by the crowd. Another interesting fact in connection with these Saturday tests was that the 6, 8 and 11 P. M. tests were invariably low. There seemed to be a reaction, or perhaps it might be said that we have about so much energy for each day and if a larger amount is used up during the morning and early afternoon, there will be less for the evening. . Again the effect of examinations furnished an opportunity to study psychic influences, and its effect upon

the ability to grip the dynamometer. In case of Subject *R* tests taken immediately after a written examination would be higher than just before the examination. This was especially true when taking the preliminary examination for the Doctorate. These examinations were taken in the evening, the subject writing from 7 P. M. to 10.30 P. M. At 6 P. M. Subject *R*'s tests were normal on both evenings upon which he wrote, while at 11 P. M. the tests were higher than at 6 P. M.; but in both instances at 6 P. M. the next day the tests were much lower. My own experience with the preliminary examinations did not agree with that of Subject *R*. After writing for three hours my dynamometric measurement was lower than before. The psychic influence is heightened by the attitude of the subject towards the mental work. With these two subjects it was entirely so, Subject *R* became somewhat nervous while Subject *K* took them as a matter of course; and the results were in fact an indication of difference of temperament.

11. After One-Hundred-Eighty Days' Rest

The writer was interested in the effect of practice, and especially in determining, if possible, the relation between the effect of practice and that of becoming accustomed to the apparatus used. Consequently after discontinuing the experiment, 180 days' tests were again taken in the same manner and at the same hours of the day as in the original experiment. These tests were continued for 50 days. The following table gives the summary results.

	7 *a.m.*	9 *a.m.*	12 *m.*	2 *p.m.*	6 *p.m.*	8 *p.m.*	11 *p.m.*
Average.	40.8	43.93	43.92	44.3	43.8	44.7	42.6
Max.	44.5	46.3	46.0	47.5	47.0	47.1	46.6
Min.	39.6	41.3	40.3	40.1	41.5	40.0	39.0
Median. . ,..	41.0	44.0	44.0	43.9	43.9	44.6	42.9
M. V.	1.2	1.04	1.22	1.5	1.1	1.15	1.3

As indicated by this table the results for the 50 days confirm the conclusions reached by a study of the 505 days. But on considering the records more in detail, it is noted that the average curve after 180 days' rest began at a higher point than when tests were begun in the very first of the original experiment; and that while there was a gradual rise there was much more uniformity than in the curve at the very beginning. This regularity was more in accord with that of the curve at the close of the original experiment, and was doubtless what might be called an echo of the practice gained during the 505 days. Again during the 505 days, I had become accustomed to the apparatus to an extent that I was

hardly conscious of the dynamometer; I could grip my maximum with perfect ease. This condition was entirely wanting when I began tests again after 180 days' rest. It seemed that I must become accustomed to the apparatus again, though I knew exactly how it should be adjusted, and had a distinct memory as to how it should feel. But it was not until after the twentieth day that I became accustomed to the apparatus, as I had been at the close of the original experiment. During all this time there was a gradual rise in the curve. In one other point the curve after rest differed from the original curve. After about sixteen days' rapid rise in the original curve there was a distinct drop, which continued five or six days. This was entirely lacking in the curve after rest. It does seem that there was an influence of practice, an echo as it were, but the very marked upward trend in the curve at the beginning was doubtless due to the fact that it took several days (at least 20) for the subject to become accustomed to the apparatus. This is especially important when we take into consideration the very great simplicity of the Smedley dynamometer.

12. After Twenty Days' Additional Rest

During the twenty days' additional rest there seemed to be nothing lost. The height of the curve was on a level with that before the rest and there was no noticeable loss in adjustment of the apparatus. The following table gives a summary of the results.

	7 *a.m.*	9 *a.m.*	12 *m.*	2 *p.m.*	6 *p.m.*	8 *p.m.*	11 *p.m.*
Average.	40.8	43.8	43.4	43.96	43.97	45.0	42.6
Max.	41.8	44.8	44.5	44.5	45.5	46.1	43.6
Min.	39.8	42.8	42.8	43.5	42.8	43.4	41.8
Median.	40.6	43.8	43.2	44.0	43.8	45.2	43.3
M. V.	0.64	0.60	0.55	0.44	0.77	1.07	0.38

13. Comparison of Results with Those of Other Investigators

All previous investigators have found a morning and an afternoon crest in the diurnal course of efficiency; and all have placed emphasis upon the morning crest. That there is a distinct morning and an afternoon elevation in the efficiency curve, my findings affirm; but the maximum is during the afternoon instead of the morning. Regarding seasonal periodicity, Schuyten and Peaks found a crest around December-January. My findings place the maximum measurement for October-November. Schuyten found a decrease in the ability to grip the dynamometer during winter and summer and a rapid rise during spring and autumn. My own data show a decline in power during winter, a gradual rise during spring, which continued through summer, with a maximum

during autumn, a sudden drop at the beginning of winter and a gradual decline which began about the middle of the winter season. Dexter pointed out marked effects of barometric and hygrometric influences. My own investigation shows there is a relation between these climatic factors and the ability to grip the dynamometer, but probably not so important as considered by Dexter. With Schuyten we agree that temperature is an important element and with Lobsien that environmental influences and especially geographical location are important.

14. General Summary and Suggestions

From the data studied and for the individuals acting as subjects we are warranted in concluding: *1* that there is a distinct diurnal course of efficiency, a low morning measurement followed by a distinct rise at 9 A. M., a slight drop at 12 M., a rise at 2 P. M., a slight fall at 6 P. M., a rise at 8 P. M. and a fall at 11 P. M.; *2* that there is no distinct weekly periodicity; *3* that there is no distinct monthly periodicity; *4* that there is a distinct seasonal periodicity, characterized by a maximum during October-November, a gradual decline during winter with a minimum during February-March, a gradual rise during spring, a high level during summer and a slightly higher level during autumn; *5* that there is a tendency for the curve of efficiency of one year to follow the general trend of the previous year; *6* that variations in climatic conditions, expressed in terms of barometric, hygrometric and thermometric records, and environmental conditions cause a variation in the ability of an individual to grip the dynamometer; *7* that physical fatigue or physical inactivity cause a marked decrease in the physical strength; *8* that mental fatigue has an influence that shows characteristics differing from that of physical fatigue; *9* that the very interesting results relating to seasonal periodicity warrant a more extensive investigation of the problem; *10* that the element of practice enters slightly but that the marked rise at the beginning of the curve is due to the subjects becoming accustomed to the apparatus; *11* that there is a need of more investigations on individual cases, more ascertained and established facts in relation to the effects of climatic changes.

V. Bibliography

1. Armstrong, R. The Influence of Climate and Other Agents on the Human Constitution. London, 1843, p. 243.
2. Bagley, Wm. C. Recent Studies in Periodicity in Mental Development. *Psychol. Bul.*, VI, 1909, pp. 188-193.
3. Bigelow, F. H. Important Problems in Climatology. *Monthly Weather Review*, 1909, Vol. 37.

4. Christie, A. S. Diurnal Variations in the Barometer. *Philos. Society of Washington Bull.,* XII, 1892.
5. Dexter, E. G. Weather Influences. New York, 1904, Macmillan.
6. —— ——. Conduct and the Weather. *Psychol. Rev. Mon. Supp.,* XI, No. 6, 1899, p. 103.
7. —— ——. The Child and the Weather. *Ped. Sem.,* V, 1897-8, pp. 512-522.
8. Fiske, John. Outlines of Cosmic Philosophy, XI, Part II, Chap. II, pp. 163-186, Boston and New York, Houghton.
9. Grey, F. J. Diurnal Variations in Weight. *Amer. Phys. Ed. Rev.,* XV, 1910, pp. 6-14.
10. Hall, G. S. Adolescence. I, Chap. VII, pp. 472-512, New York, 1907, Appleton.
11. Hann, Julius. Handbook of Climatology (Trans.) Part I, General Climatology, pp. 43-46. New York, 1903, Macmillan.
11b. Huntington, Ellsworth. Work and Weather. *Harper's Magazine,* CXXX, 1915, pp. 232-244.
11c. Lehmann, Alfred and Pedersen, R. H. Das Wetter und unsere Arbeit. Experimentelle Untersuchungen über den Einfluss der meteorologischen Faktoren auf die körperliche und seelische Arbeitsfähigkeit. *Arch. f. d. ges. Psychol.,* X, 1907, S. 1-104.
12. Lemon, J. S. Psychic Effects of Weather. *Am. Jour. Psychol.,* VI, 1893-4, pp. 277-279.
13. Lobsien, Marx. Schwankungen der psychischen Kapazität. Einige experimentelle Untersuchungen an Schulkindern. *Samml. v. Abh. a. d. Geb. d. pädagogischen Psychologie und Physiologie,* V, 1902, pp. 1-110.
14. MacDonald, A. Normal and Abnormal Man. *Bureau of Education, Circular of Information,* No. 4, 1893, pp. 445, Government Printing Office, Washington, 1893.
15. Marsh, H. D. The Diurnal Course of Efficiency. *Archives of Psychology,* VII, 1906, pp. 1-96.
16. Martin, E. C. Our Own Weather. p. 281, New York and London, 1913.
17. Moore, W. L. Descriptive Meteorology. Chap. XV, pp. 258-282. New York and London, 1910.
18. Newton, R. C. Some Personal Observations upon the Effects of Change of Climate upon Men and Animals. *Inter. Med. Mag.,* 1897.
19. Osborne, W. Determination of Subjective Temperature. *Bul. Philos. Society,* Washington, XI, p. 63. Smithsonian Miscellaneous Collections, XX, 1881.
19a. Peaks, A. Archives of New York University, School of Pedagogy. (Unpublished.)
20. Schuyten, Dr. Influence de la temperature atmosphérique sur l' attention voluntaire des eleves: Recherches expérimentals faites dans les écoles primaires d' Anvers. *Bull. de l' Acad. Roy. de Belgique,* 3me série, Tome XXX, No. 8, 1896, & 3me série, Tome XXXIV, No. 8, 1897. Reported by Lobsien in *Pädagogische Psychologie und Physiologie,* V, 1902, pp. 7-33.
21. Storey, T. A. Daily Variations in Strength. *Amer. Phys. Ed. Rev.,* VI, 1901, pp. 293-297.
22. —— ——. Daily Variations in the Power of Voluntary Muscular Contraction. *Amer. Phys. Ed. Rev.,* VII, 1, pp. 188-211, 1902.
23. Spencer, Herbert. First Principles, Chap. X, pp. 250-271. New York, 1909, Appleton.
24. Titchener, E. B. The Psychophysics of Climate. *Am. Jour. Psychol.,* XX, pp. 1-14, 1909.

25. Tyler, W. F. The Psyphysical Aspects of Climate. *Jour. Tropical Medicine and Hygiene,* April 15, 1907.
26. Ward, R. DeC. Climate—Considered Especially in Relation to Man. New York, 1908, p. 372, Putnam.
27. —— ——. Climate in Some of its Relations to Man. *Popular Science Monthly,* LXXXI, 1910.
28. Williams. Humidity and Scholarship in School. *Amer. Phys. Ed. Rev.,* XV, 1910, pp. 600-604.

A COMPARATIVE STUDY OF THE CURRICULA OF WELLESLEY, SMITH AND VASSAR COLLEGES

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The significance of the subject matter which forms the material of the course of study, Dewey finds, is to present phases and results of community life of such typical value that it is necessary to insure their continuous transmission (11). If any college were to develop in its curriculum an actual fulfillment of his succinct statement, the increasing number of its matriculations would become of immediate concern.

Particular ideas dominate at different times, and the present trend in this country towards "opportunity and freedom" finds its most essential expression in invention and science. A man or woman not wishing to experience the sensations of a "man without a country" must be able to understand and appreciate the prevailing scientific attitude of the twentieth century. The fundamental tone of our curricula must be scientific; and present collegiate curricula should become scientific interpretations of life's interests.

It is the purpose of this paper to give the results of a practical investigation of the curricula of Wellesley, Smith and Vassar Colleges, and, on the basis of the studies actually elected by the students, to ascertain the direction of the modern college girl's development.

These three important colleges, Wellesley, Smith and Vassar, were selected because of the large number of students enrolled in 1915 (5.28.32). At Wellesley are recorded 1,452 students, as follows: 1,345 undergraduates, 85 non-candidates for degrees and 22 resident candidates for the Master's degree. Smith College has 1,638 students, including 31 graduate students; and Vassar College a total of 1,120 undergraduates.

The geographical location of the three colleges is favorable, relative to both student enrollment and natural scenery. The General Education Board has emphasized the importance of the former. The Board in 1915 (16) found that the majority of students will live within 100 miles of the institution. Of Smith students, 14% came from within 50 miles of the college, 35% from within 100 miles; at Vassar, 9% came from within 50 miles, 42% from within 100 miles. In both colleges 86%

of the enrollment was from territory east of the Mississippi and north of the Ohio.

The natural surroundings of these three institutions are excellent. The beautiful Wellesley campus appears as a miniature New England hill district, well supplied with forest growth, with buildings impressed, and opening on Wellesley's famous lake. Smith College is at Northampton, in pleasant proximity to Mount Holyoke, Massachusetts Agricultural and Amherst Colleges. The campus and town are surrounded by wide New England rural scenery, which offers opportunity for rich appreciation. Vassar College, farther west in the famous region of the Hudson, is suggestive of the small city-beautiful, thoughtfully planned for the welfare of its student community. To be sure the campus paths run straight in contrast with the "Indian paths" of Wellesley, and the campus is quite level. Yet turn from the main plateau and the Vassar lakes with their rolling hills at once occupy the foreground. It is no exaggeration to emphasize the favorable locations of these colleges.

The Faculty and the Departments

A survey of faculty and departments is a necessary preliminary to the study of a curriculum, and since the most obvious criterion of any faculty is a summary of the ranks and degrees of its members a comparative table has been prepared showing the relative numbers, ranks and degrees of the three faculties under consideration. (See following table.)

At Wellesley approximately one-fourth of the professors hold the degree of Doctor of Philosophy, while at Smith and Vassar 80% of the entire number have this degree. It may be noted especially that at Vassar the remaining twenty professors, with one exception, hold some form of the doctorate. In the three colleges there are but two Doctors of Letters.

The important item with reference to the associate professors and instructors is the increase in the number holding the doctorate. More than half the associate professors of both Wellesley and Smith, and all at Vassar, have the degree of Doctor of Philosophy. Wellesley has no ranking of assistant professor, but the figures for Smith and Vassar show an approximate similarity. In each college, the three divisions of instructors, assistants, and lecturers combined outnumber the professorial faculty in the number of degrees. Superiority of the younger teachers in this respect points to the increasing importance of this degree in securing a position in the larger colleges.

COMPARATIVE TABLE OF FACULTIES: NUMBERS, RANKS AND DEGREES

		Number	L.L. D.	Ph. D.	M. A.	B. A.	Ph. B.	Miscel.	No degree	Number of doctorates
Profs.	Wellesley	29	1	7	7	5	...	6	3	11
	Vassar	21	1	15	1	...	...	4	...	20
	Smith	35	...	24	4	2	...	3	2	25
Assoc. Profs.	Wellesley	32	...	19	7	1	...	5	...	21
	Vassar	8	...	8	...	...	...	...	...	8
	Smith	22	...	12	5	1	...	2	2	12
Assist. Profs.	Wellesley	...	...	...	...	...	...	...	...	....
	Vassar	12	...	7	1	2	...	1	1	8
	Smith	17	...	6	4	2	...	1	4	6
Instructors	Wellesley	59	...	17	19	6	1	6	10	18
	Vassar	40	...	13	12	8	...	4	3	13
	Smith	46	...	11	15	6	...	3	11	11
Assistants	Wellesley	10	...	...	4	3	...	...	3	....
	Vassar	16	...	2	1	9	...	2	2	3
	Smith	10	...	...	4	2	...	...	4	....
Lecturers	Wellesley	8	...	3	2	1	...	1	1	4
	Vassar	1	...	1	...	...	...	...	...	1
	Smith	1	...	...	...	...	...	...	1	....

In general, of the total faculty of 138 at Wellesley, 39% hold some form of the doctorate; of the faculty of 131 at Smith, 41% hold this degree; while this is true of 54% of the faculty at Vassar. Another matter of comment is the number holding no degree whatever; for at Smith 24, at Wellesley 17, and at Vassar 6 members of the faculties are thus classified. This question resolves itself when from the total of 47, it is found that 19 are in departments of music, 12 in departments of hygiene and 9 in departments of modern languages. The very nature of these courses, which demand practical skill, may require the services of teachers possessing the ability but no degree.

Another interesting point in the college for women is the number of men on the faculty. At Wellesley the percentage of male faculty members is 16%. With one exception, all hold degrees, and one-half possess the doctorate. At Vassar, they constitute 19% of the faculty. With two exceptions, all possess the doctorate. The percentage at Smith reaches 33%. All but five hold some degree, and two-thirds are Doctors of Philosophy. In brief, the percentage at Smith is double that at Wellesley, and wants only a trifle of doubling that at Vassar.

The three colleges may now be considered with respect to their departments. Of these, there are 28 at Wellesley, 24 at Smith and 23 at Vassar. At Wellesley, however, there are three distinct departments of English under the general title

"English," and Mathematics is grouped into the "Pure" and "Applied." Vassar has no separate faculty for Italian and Spanish, so these fall within the department of French. This explanation levels the departments numerically. There are also minor points of interest. At Vassar, for instance, Psychology is a separate department; at Wellesley and Smith it is included under Philosophy. Both Wellesley and Smith possess departments of Education, whereas Vassar has none. On the other hand, Vassar alone has a department of Political Science. The department formerly known as "Elocution" now appears as "Spoken English" at Smith and Vassar and "Reading and Speaking" at Wellesley.

Naturally there are important differences in the number of faculty members in each department. At Wellesley the count ranges from one to twenty-three, at Smith from one to seventeen, at Vassar from one to fifteen. A classification based on the number of instructors shows seven large departments, of which English is the largest and History next. There follow in order the departments of Music, Botany, French, German and Mathematics.

Still more interesting and suggestive of tendencies in departmental preferences is a classification showing the relative sizes of the departments on the basis of the number of courses offered in each. This tabulation shows six prominent departments. English leads, then Latin, German is a close third, while History, French and Greek follow. The preëminence of such departments is a self-evident commentary of the insistence of these colleges upon the so-called cultural or language studies, the greater part of which will probably never function in the student's life, unless in the vaguest way. Such an unfortunate emphasis almost inclines to a belief that women have not the capacity to organize a proper curriculum for themselves. Comparing these results with those from the former classification by number of faculty members, it may be noted that the departments of English, History, French and German appear in both groups. This certainly suggests that much work is done in these subjects.

In order to make this outline-diagnosis of the departments complete, some statement of the total number of courses offered is essential. The results are presented in tabular form, so to be as comprehensible as possible. (See following table.) This tabulation shows a preponderance of year courses over semester courses at Wellesley, an approximate equalization at Smith, and over twice as many semester courses as year courses at Vassar. In all three colleges, the number of 3-hour courses, both year and semester, is most marked. A striking fact is that a total of 80 courses were not offered at Wellesley

during the year 1914-1915; and similarly in 1913-1914, 72 courses were not offered. The figures in this regard at the other two colleges are comparatively small. The grand totals of year-hours offered are 537, 458 and 386 for Smith, Wellesley and Vassar respectively.

DIFFERENTIATION OF COURSES (1914-1915)

	Total number of courses	Total number of year courses	Total number of year 3-hr. courses	Total number of year 2-hr. courses	Total number of year 1-hr. courses	Total number of year 4-hr. courses	Total number of semester courses	Total number of semester 3-hr. courses	Total number of semester 2-hr. courses	Total number of semester 1-hr. courses	Total number of year-hours	Courses not offered	Courses not offered, year 3-hr.	Courses not offered, year 2-hr.	Courses not offered, year 1-hr.	Courses not offered, semester 3-hr.	Courses not offered, semester 2-hr.	Number of hours not designated
Wellesley....	205	157	106	16	34	1	48	44	4	...	458	80	38	3	8	28	...	3
Smith.....	287	164	91	51	22	...	123	54	48	21	537	14	1	4	...	3	5	1
Vassar*	223	69	53	6	8	...	154	111	23	9	386	19	2	1	...	11	5	..

Figures do not include courses in the Department of Hygiene nor courses open only to graduates.

* Counted in with the total number are 13 courses with an indefinite number of hours; for instance, 2 or 3 hours. In each case the lowest number was taken for calculation.

REQUIREMENTS

Previous to the study of the curriculum proper, it is essential to obtain an intelligent perspective of the requirements for degrees. This paper is concerned only with the requirements for the degree of Bachelor of Arts. It should be noted that these colleges are uniform in requiring the normal four-year course for this degree. Both Smith and Vassar require the same number of year-hours (56) for graduation, but Wellesley increases this number by three. Differentiating the total number of year-hours required, Smith and Vassar hold the student responsible for 21 hours of definite requirements; while Wellesley, owing to an additional two hours of Biblical History in the junior year, exacts 23 hours. Smith and Wellesley further require 18 hours of concentration; while Vassar does not. As a result, Vassar students have approximately twice the number of year-hours of free electives as in the other two colleges. To compare clearly the

requirements for each of the four academic years a table has been prepared. (See following table.)

From this perspective definite conclusions may be drawn. There are two methods of distributing the total number of hours required. (a) Wellesley employs a gradation ranging from 16½ in the freshman year down to 12 hours in the senior year. In fact, if Wellesley did not include two hours of Hygiene in this requirement, the figures would be similar to Vassar's with the following exceptions. (1) At Vassar a sophomore may take 15 hours in the first semester and 14 in the second; at Wellesley the requirement is 15 hours for the entire year. (2) Wellesley requires 15 hours in the junior year and Vassar 14 hours. (b) The second method of spreading the required hours consists in complete uniformity throughout the four years. This is employed at Smith. The former gradation system, however, is obviously better adjusted to proportionate increases in intensity of study and interest as the student fulfills the requirements and selects a more or less special field for individual work in the upper years.

REQUIREMENTS DIFFERENTIATED

		Required minimum of hours	Electives	Mathematics	English	History	Modern language	Ancient language	Science	Biblical literature	Philosophy	Hygiene*
Freshman Year	Wellesley	16½	6	4	2	..	(3)	..	(3)	..	..	1½
	Smith	14	3	3†	*2*	..	*3*	3	..	..	..	...
	Vassar	15	6	3	3	..	..	3	..	..	..	...
Sophomore Year	Wellesley	15½	8	..	2	..	..	..	3	2	..	½
	Smith	14	7	..	..	*2*	..	..	*3*	2	..	...
	Vassar	15 (14)	6	..	..	*3*	*3*	..	*3*	..	..	...
Junior Year	Wellesley	15	10	..	..	..	..	..	..	2	3	...
	Smith	14	11	..	..	..	..	..	..	..	3	...
	Vassar	14	11	..	..	..	..	..	..	..	3	...
Senior Year	Wellesley	12	12	..	..	..	..	..	..	..	..	...
	Smith	14	14	..	..	..	..	..	..	..	..	...
	Vassar	12	12	..	..	..	..	..	..	..	..	...

* Hygiene at Smith and Vassar not counted in number of hours.
† Or its substitute.
Italicized figures denote course to be taken either in freshman or sophomore year.
( )—either—or.
In addition are certain requirements not counting toward the degree.
Unit is the year-hour.

Moreover, a student must not only "pass" each course during the four college years, but must also attain a certain grade. At Smith, seven hours in each semester of the first two years and eight hours of the last two, must be above the

passing grade. Wellesley require a ranking of "passed with credit" in eight hours for each semester during the first two years, and in nine hours during the last two. At Vassar "a student must have as many marks above C as below C," and beginning with the class of 1917, one-third of the marks must be above.

The precise number of elective hours in the freshman and sophomore years is difficult to determine. Though there are certain definite requirements such as Mathematics and English, certain subjects, well designated perhaps as "catalog electives," are so hedged with warnings that they become confusing requirements. This is perhaps necessary owing to the lack of uniform entrance requirements. In general, the freshman and sophomore years are practically devoted to passing off requirements.

On the other hand, with the exception of Wellesley, whose number reaches five hours on account of the probably unnecessary two-hour Biblical History requirement, each college requires three hours in the junior year, and none in the senior. Essentially, then, the junior and senior years are given over mainly to concentration and free electives.

Certain observations may be made regarding the studies themselves. Three hours of Mathematics (at Wellesley four hours) are required in the freshman year, though at Smith a course in Argumentation may be substituted. A year's work is required in English at Smith and Vassar, but two years' work in the department at Wellesley. Moreover it is to be noted that at Smith, in addition to this requirement, each student must each year take a course in English; these courses, however, are essentially theme work and do not count toward the degree. Finally, Wellesley requires four hours of Biblical History, Smith two hours, and Vassar none. At Smith and Vassar a year's work in History as well as in Modern Languages is required either in the freshman or sophomore years; also three hours of Greek or Latin in the freshman year. Philosophy is a requirement in all three colleges. For most students, Wellesley requires six hours of science, while each of the two other colleges restricts itself to but three hours. In addition, certain requirements must be met, such as a fixed number of Gymnasium hours, talks on Hygiene, and at Smith, lectures on "the College."

It has been noted that both Wellesey and Smith require eighteen hours of concentration. This is perhaps the most interesting feature of the requirements for it is at once an accepted antidote for excessive "scattering" and the occasion for the focussing of the student's "free electives" to the point of individual inclination. Vassar, as has been stated, has no

such system, but allows far greater freedom for individual inclination, though two restrictions are enforced. (1) "Courses may not be taken in more than five departments in one semester." (2) "Not more than six hours may be taken in one department in any semester, except by special permission of the Faculty."

At Wellesley every candidate for the Bachelor's degree must elect 18 hours of major work. She must complete 9 hours in each of two departments, with at least 6 hours above grade I and 3 hours in grade III. (Grade I signifies an elementary course, grade II the intermediate, and grade III the advanced.) As an alternative, she may complete 12 hours in one department and 6 in a second. The former must include at least 9 hours above grade I and 6 hours in grade III; and the latter must include 3 hours above grade I. One full course of advanced grade must be taken in the senior year. The Wellesley student therefore concentrates more or less in two departments. From statistics of the class of 1915, the average amount of advanced work elected per student in the junior and senior years was found to be nine hours. This is perhaps of interest in connection with the Committee on Economy of Time in Education's recent recommendation that the last two years of college be devoted to specialized professional or graduate work. At Smith, juniors and seniors are required to pursue a "main study" which involves two consecutive 3-hour year-courses in one department, supplemented by four 3-hour year-courses to be taken two in each of the junior and senior years.

A Statistical Study of Individual Curricula

The actual courses taken for their degrees by 413 students in ten colleges, were examined in 1909 by Thorndike (24). This study included twenty-two Wellesley women; and his results showed that 55% of this small group spent over half their college course in languages and literature, only 5% in natural science, and but 5% in music and art. Ferry has made a more elaborate investigation of the student hours of instruction in eighteen American colleges for 1911-1912 (13). His figures for Smith, however, are based only on the first semester of the college year. He found that Smith ranked as fifth in the relative amount of work done in the foreign languages, although Wellesley was seventeenth. Moreover, in a grouping of studies including English, History and Philosophy, he found Smith in third place, and Wellesley fourth. In the science division, in contrast, Wellesley ranked as tenth and Smith as seventeenth. These studies corroborate the "popular" assumption that colleges for women graduate a

majority of students who have specialized in their language and literature departments.

To present a more explicit and detailed account of the courses of study patronized by the modern college girl, we have collected the individual curricula for the entire four-year collegiate course of the classes of 1915 at Wellesley and Vassar. At Smith, since the student slips for the first two years were destroyed and no other source was open to us, we were able to obtain such data for only the junior and senior years. Statistics were thus obtained for 261 students at Wellesley, 205 students at Vassar and 287 juniors and seniors at Smith.

For an orientation as to the nature of the specialization in these colleges, these curricula were first classified on the basis of the number of students taking 10% or more of their work in any one of the departmental groupings. The results showed a striking specialization in the English departments, which held 82% at Wellesley and 81% at Vassar. There is a similar high per cent. of concentration in modern languages, involving 76% of the Vassar students and 73% at Wellesley. Concentration to this degree in ancient languages is not marked, being a negative quantity at Wellesley and Smith, although with 17% at Vassar. In the History grouping Vassar leads with a percentage of 79%, while 74% of the Wellesley students similarly specialize. When Economics and Sociology are differentiated from this History grouping, however, it appears that at Vassar the former enjoy an approximately equal amount of concentration as does History. In contrast to this more modern trend, Wellesley students devote practically three times as much intensive work to the study of History as to that of Economics and Sociology combined. This result is emphasized by the fact that History at Wellesley is not a requirement for the degree. A similar condition probably exists at Smith, where the number of students found electing History to this extent is over five times as great as the number electing Economics, in spite of an excellent department, the percentage being only 7%. Finally, it is important to note that nearly two-thirds of the students at Vassar specialize to this extent in Philosophy. A differentiation of this Philosophy grouping, moreover, shows this to be a modern and presumably desirable trend, for the amount of concentration in the science of Psychology is then seen to be five times that in Philosophy proper.

A more important tabulation shows the per cent. of students concentrating to the extent of 20% or over of the entire course in any group. This is a second and more intensive proof of the magnetic power of the English departments, for

51% and 36% of the students at Wellesley and Vassar respectively, and 27% of the juniors and seniors at Smith, concentrate to this extent. More than half the students of Wellesley and more than one-third the students of Vassar spend one-fifth their entire course in English. In all three colleges modern languages still hold their own, though to a less extent than English, for 27% and 26% of the students at Vassar and Wellesley respectively, and 9% of the juniors and seniors at Smith, concentrate in them to this extent. Little specialization of this extent is found in the sciences, although in general Wellesley here holds the highest rank. Thus at Wellesley, 11% are specialized to this extent in Astronomy, Geology, and Botany, 2% in Zoology, and 2% in Physics and Chemistry; at Vassar but 3% specialize to this extent in Physics and Chemistry; while but 2% of the Smith juniors and seniors so concentrate in Physics and Chemistry, and but 1% in the Astronomy, Geology and Botany group. The lack of emphasis of these colleges upon the sciences therefore, is out of all proportion to the present importance of these branches of study.

Thorndike, it will be remembered, found a specialization of over half of the entire course in the language and literature groups, among 55% of 22 Wellesley students. This small group alone is of course inadequate for statistical treatment, and his results are accordingly far larger than those obtained by us on the basis of 261 Wellesley students. We found 16% of Wellesley girls spending over half their course in the language and literature groups. Even greater need of improvement in this respect was found at Vassar and Smith, for 25% of Vassar students so concentrated, and 31% of the Smith juniors and seniors. It is significant perhaps that at Vassar, lacking a system of concentration, this emphasis should still be appreciably greater than at Wellesley.

"Scattering" exists, using Thorndike's basis, when a student fails to give at least one-fifth of the total degree requirement to any one of the subject groups. These groups, parenthetically, are Ancient Languages, Modern Languages, English, Philosophy (including Psychology), History (including Sociology and Economics), Physics and Chemistry, Zoology, other sciences, Mathematics, Music and Art, Hygiene, Biblical History, and Education. With this criterion Thorndike found negative results at Wellesley. Similarly, we found scattering in the curricula of but 3% of Wellesley students, and among only 1% at Smith. At Vassar, on the other hand, the percentage of scattering rises to 12%, though this is low for a college having no system of concentration.

Turning now specifically to freshman "electives," a sta-

tistical statement readily shows their limitations. At Wellesley 56% elected German, at Vassar, 39%; while at Vassar 64% elected French, and 53% at Wellesley. Whereas 51% of Vassar freshmen elected History, but 21% did so at Wellesley. Attention should also be called to the fact that 27% of Wellesley freshmen commenced English in the freshman year, in addition to the requirement. There is no such early specialization in this department at Vassar. At Wellesley, moreover, 44% of the freshmen elected Botany to carry out the science requirement; while 26% of the Vassar students filled their science requirement in Chemistry, and 13% in Physics.

It is also of interest to note in passing that the electives of Phi Beta Kappa students confirm the results already obtained. From a total of 73 Phi Beta Kappa students from the three colleges, the largest number of year-hours was in the department of English. In the order of decreasing numerical importance follow History, Mathematics, German and French.

Accepting as a fact then, from the studies by Thorndike and Ferry and our own data, that the election of a large per cent. of the courses in these colleges centers in the departments of English, History, German and French, particular attention may now be given to a detailed study of other departments of perhaps essentially greater import. Such departments are, in our judgment, those of modern Psychology, Education, Economics and Sociology, and the biological and natural sciences.

With the exception of Vassar, the work done in Psychology is confounded with Philosophy. At Wellesley three hours of "Philosophy" are required in the junior year, with an option of one semester of Introduction to Philosophy or a year in Experimental Psychology. Such a course in Philosophy should be of real value, for the introduction is given by Miss Calkins and is followed by a course aiming to discuss "the philosophical problems raised in the study of Psychology." From the total of 261 students, 153 elected this course, while 108 took the Experimental Psychology. However, only fourteen additional courses were taken in Psychology: of the 261 students, but 2 elected two 3-hour courses in Psychological Research and only 10 one 3-hour course in the same subject. Instead, the philosophical side was emphasized and 113 additional courses taken in that subject. Most popular was a 1-hour course in Social Ethics, aiming to develop a "comprehensive conception of human life," and following in order of importance were Modern Philosophy, Logic, and Greek Philosophy, elected by 42, 34, 17 and 14 students respectively.

Smith also has a 3-hour philosophical requirement in the junior year, with a similar option of either one semester of Psychology or one semester of Introduction to Philosophy, in connection with a semester's work in Logic. If this requirement in Logic adequately brings before the student "the methods of science," it should be of value. In addition to the requirement, however, only 30% (85) of the entire number continued work in either of the two subjects. In order, Greek Philosophy, Modern Philosophy, and Ethics were elected by 37, 29 and 15 students respectively. Further, 19 of the students took one year of Advanced General and 15 one year of Advanced Special Psychology. In all, 86 additional courses were elected in Philosophy, and but 47 in Psychology. In this result, as at Wellesley, the emphasis is on Philosophy; although the Wellesley emphasis in proportion, is nearly five times as great.

At Vassar the requirement in Philosophy offers no option, and consists in a semester's Introduction to Philosophy and a semester's Ethics. The latter after 1914-1915 ceases to be a requirement. Having completed the requirement, only 29 of the students elected any further course in Philosophy. Of the two departments at Vassar, that of Psychology is of primary interest. In fact, 89% or all but 23 of the class of 1915 elected some course in this department. Of these, 181 elected a semester of Introductory Psychology. The next course to be most frequently elected was Social Psychology, selected by 94 students, which is 52% of the total. This is an admirable illustration of students becoming acquainted with the fundamentals of a science and then desiring advanced work in the subject along lines involving "something human." This course, indeed, suggests an excellent opportunity for correlation with sociological work. Next in importance are Introductory Laboratory Psychology, Genetic Psychology, and Applied Psychology, elected respectively by 46, 33 and 27 of these students. The emphasis placed by Vassar upon this department should be carefully noted.

From this intensive study of the departments of Philosophy and Psychology in these colleges, certain conclusions may be drawn. I. *Philosophy.* First, exclusive of the requirements, the total number of courses elected in Philosophy at Wellesley, Smith and Vassar are 113, 86 and 34 in the order of enumeration. That is, the figure at Wellesley approximates that of Smith and Vassar combined. Second, the courses of largest relative importance are those in Modern Philosophy. This would tend to indicate what the modern girl desires in Philosophy, namely, something of present-day value and which may be correlated with other findings in the different realms

of science. II. *Psychology.* The differentiation of Psychology from Philosophy reveals startling differences in the number of courses elected at the three colleges. At Wellesley only 16 courses were taken beyond the requirement, 47 at Smith and 403 at Vassar. In short, the number of courses taken at Vassar is over six times as large as that taken at both Smith and Wellesley combined. At Wellesley the few students continuing emphasized the research courses; at Smith emphasis shifted between advanced general and advanced special Psychology. At Vassar the students turn first toward Social Psychology and second, to practically one-half the extent, become acquainted with introductory laboratory work. Psychology is a most pertinent science, and every college student should receive at least an "introduction."

The Economics department at Wellesley offered eight courses for the year 1914-1915, and of these the only ones which touch upon Sociology are two semester courses in Social Economics "open to seniors and by special permission to juniors." This presents a somewhat anomalous situation as regards Sociology. Even when the single course in Introductory Sociology was offered the preceding year, it was elected by none of the students. Probably the essential cause for this neglect of an important science is the preliminary requirement of two courses in Economics. Comparatively, therefore, Wellesley ranks below the other colleges in Sociology. Elements of Economics is a requisite for the election of further courses in the department, and was taken by 92 of the students for the year and by 2 for one semester. Semester courses in Immigration and in the History of Economic Theory were elected by 52 and 51 respectively, this being a favorite combination. The course in Social Economics ranks third with 30 students; this is a trifle less than one-third the total number of students registered in this department, and suggests that additional courses sociological in nature should meet a ready response.

Similarly with Wellesley, Vassar also emphasizes the economic rather than the sociological. The closest approach to Sociology is the course in Charities and Corrections, elected by 70 of the students. Exclusive of the Introduction to Economics elected by 132 of the students, and those affected by the elective stimulus of "Socialism," this is the course best supported. This would rather imply that courses such as General Sociology, Social Institutions and Problems, would also prove a valuable asset to this curriculum.

The high relative standing of Smith should be carefully noted, with reference to the number of courses elected in Economics and Sociology. Sixteen semester courses are of-

fered and though open only to juniors and seniors, not one was favored with less than 8 students. In sharp contrast to Wellesley, the course in Introductory Sociology is elective irrespective of previous courses taken in the department, and glancing at the electives we find that 145 students elected this course. With the exception of 5, all elected a second semester's work in Social Pathology. On the other hand, but 31 of the students selected the semester of Principles of Economics. This indicates in a marked way that given an equal choice between Economics and Sociology, the student tends to elect the latter. Courses next in order of popularity were Recent Economic Changes, Socialism and Social Reform and History of Social Theories.

In conclusion, the percentages of students studied who elected some course in these departments are a total of 56% at Wellesley, of 68% at Vassar and of 85% at Smith. It is also evident that, with the exception of Smith College, the department of Economics and Sociology implies an Economics department plus a slight sprinkling suggestive of Sociology. During the year 1914-1915, Smith was the only college offering even an introductory course in Sociology. Of the twenty-four titles of the courses offered in these colleges, eighteen are economic, three with sociological bearings, and only three distinctly sociological. The fact must be seriously considered, that just as Biology is important as the science of life, so Sociology, the science of human inter-related life, should be of equal or even greater value, and deserves an emphasis before the student at least equal to the special social science of Economics.

While considering the social sciences, an added topic of interest is to be found in the Political Science department, which Vassar alone has differentiated. This is a new department, commencing in 1913 with one professor and four semester courses. In 1914 two courses were added, a year course in Modern Government and a semester course in Constitutional Law. In 1916 there will be six lectures on law given at the college. The class of 1915 was the first to elect courses in this department, and their response would tend to show the value of just such courses to the modern woman with a vital interest in modern government. A total of 50 of the students, or 24%, selected at least one course. The larger number elected Diplomacy, chiefly "a study of American diplomacy," International Law, Jurisprudence and Modern Governments. Excepting The Theory of the State, everything offered was sampled. These facts are significant for they suggest the active interest of nearly one-fourth the Vassar students in political science.

In comparison with departments already discussed, the departments of Education receive a very minor emphasis. At Wellesley but three such courses are open to undergraduates. Of the 127 students studied who elect work in the department, all but 5 stop after a year's course. More definitely, 116 students elected the Introductory Course in Education for one year, 11 for only one semester, and only 5 of these students elect the advanced course of Problems in Education. In brief, just 49% of the class of 1915 received any instruction in Education.

The relative number of students electing Education at Smith is still less, being 34% of those studied. Of these, 6 elected in the junior year and 92 in the senior. All selected one 3-hour year course in the Principles and Problems of Contemporary Education, with the exception of 15, 13 of whom elected but one semester and 2 a maximum of four and one-half hours.

The only course in Education offered at Vassar is included under the department of Philosophy. This is a 3-hour semester course in the History and Principles of Education, and elected by 20% of the students in the class of 1915. In comparison with the widespread importance of educational subjects both in their general and vocational phases, these provisions would seem very inadequate.

In order to comprehend in full the present hopeful rise of the sciences in these Arts Colleges, a completer survey than simply the psychological and sociological sciences is necessary. From a comparative standpoint, with regard to the science departments of Chemistry, Physics, Zoology, Botany, Geology and Astronomy, Vassar, proportionately with her class of 205, leads with a total of 501 courses elected in these departments; while the 261 Wellesley students are a close second with 542; and 215 such courses are elected by the 287 juniors and seniors at Smith.

The largest amount of work is taken in the department of Zoology, by 55% at Vassar, 47% at Wellesley, and by 27% of Smith juniors and seniors. The department of Chemistry is second, with 78% at Vassar, including the requirement, with 26% at Wellesley, and with 11% of Smith juniors and seniors. Botany is third, with 62% at Wellesley, including the requirement, with 10% at Vassar, and with 16% of Smith juniors and seniors. Then follows Geology, with 40% at Vassar, 26% at Wellesley, and 11% of Smith juniors and seniors; Physics, with 39% at Vassar, including the requirement, with 19% at Wellesley, and 2% of Smith juniors and seniors; Astronomy, with 26% at Wellesley, 21% at Vassar, and 7% of Smith upper-classmen.

Two general results are obtained by this review of these sciences: (1) There seem to be fewer advanced electives in those departments where the student fills her science requirement; as, for example, at Vassar, where only 15% of the students continued their work in Physics and only 20% in Chemistry in contrast with the 40% electing work in Geology, or the 55% in Zoology. (2) At both Wellesley and Vassar, with the exception of the Vassar department of Botany, 52 of the students form the lowest total in any one of the six science departments considered, while seven of these departments have an enrollment of over 80 students. This would seem to denote a distinct rise in the importance of the sciences at these colleges, though the amount of science work is still surprisingly small.

Contrasted with the rise of the sciences is the decline of the classics. At present both Smith and Vassar still require three hours of Greek or Latin for graduation, though a tabulation of the percentages of students who actually continue the study of Latin and Greek presents results relatively insignificant. The elections at Wellesley and Vassar are surprisingly similar. At Wellesley 10% and at Vassar 9% of the students elected Greek; at Wellesley 23% and at Vassar 24% of the students elected Latin.

Another subject open to controversy is that of instruction in Biblical History, for Wellesley requires four hours of Biblical History, two in the sophomore year and two in the junior year. This requirement may be filled by taking four, five or six hours in the department, according to the course taken. The fact that but 7% of the students continued work in this department, would itself seem to question the necessity for such a requirement.

Smith also has a two-hour requirement in the sophomore year; and while a tabulation shows that 24% of the students elected advanced courses, one-half were for only one and one-half hours. About one-third of this 24%, moreover, did work in Comparative Religion. The requirement is one of three courses in Biblical Introduction, two of three hours and one of two hours; while a course in Greek Testament may be substituted for the second semester; this is apparently more liberal than the Wellesley requirement.

At Vassar, representative of no requirement, 21% of the students worked in the department of Biblical History, the courses preferred being The Life of Christ, The Apostolic Age and The History of Religions.

The statement is not infrequently made, with no attempt at scientific proof, that a girl goes to college for the supposed "general culture" obtainable from study in language, literature and music. It has already been shown that there is an

over-emphasis at these colleges upon language and literature at the expense of valuable work in science. No such charge, however, is leveled against the large and important departments of Music of these three colleges. According to G. Stanley Hall, there is no subject in the college curriculum that should be taken by so large a proportion of students, one of the important reasons being that "music is the language of the feelings, sentiments and emotions" which "constitute three-fourths of life" (17). The excellent opportunities offered by these colleges for a musical education should be carefully noted. Not only are appreciative and theoretical courses emphasized, where no previous technical knowledge is required, but also the practical, so that in some way all students may be able to respond.

The Wellesley department of Music offers nine courses in musical theory and, according to the departmental statement, these "are open to all students without regard to previous musical knowledge." In addition, practical instruction is given in pianoforte, organ, violin and singing. Unless the practical work is in Interpretation, Applied Harmony, Applied Form or Applied Counterpoint the hours do not count towards a degree. Any student who desires her Bachelor's degree in four years may take practical work provided she has first obtained the permission of the Dean of the College. Any student who intends to spend five years in her college course, if she elects each year certain courses in the department, may also receive the certificate of the Music Department in addition to her degree. In the class of 1915 36% of the students took 548 hours in the department, amounting to an average of 5.7 hours per student. In addition, 16% of the students studied took practical work.

Smith also has an important department of Music, which includes twelve courses, as well as practical instruction in pianoforte, organ, violin, violoncello, voice and ensemble. If the student has passed the required examinations, "practical work may be counted within the minimum of hours provided it is sufficiently advanced in character." Not more than two hours, however, may be so counted, and this "must be accompanied by theoretical work for one year." Of the juniors and seniors, 31% elected both practical and theoretical courses, while 21 confined themselves to theory. The General History of Music and Musicians was the most favored course, while in the practical work the larger number specialized in pianoforte and voice.

Vassar's department presents a series of ten courses all of which are in sequence, with the exception of three courses in Appreciation. Investigation shows that the latter type of course is favored, since, of the 35% (72) who elected work

in the department, 44 selected the course on Bach, Beethoven and Wagner and 37 the Historical Development of Music. Elementary Harmony was elected by 28 and Interpretation by 13 of these students. In addition, there is instruction in "pianoforte, organ and violin playing and in solo singing, but this work does not count toward the degree." The percentages for all three colleges are remarkably similar, and though small, are significant as representing the development in 238 students of an aesthetic appreciation of the world's music, which should function through life.

In order to complete a well-rounded survey of these present curricula, attention must also be focused upon the very practical departments of Hygiene, a present-day study which presumably should receive special stress. In the departments of all three colleges, each student is carefully examined on entrance by the college physician, and sufficient data secured to prescribe the proper amount and nature of exercise. The fact that a certain amount of corrective exercise is required of students with slight abnormalities, in itself shows that the department aims to study the individual and follow up with the necessary steps to build a well-rounded physical development. Moreover, as typified by Wellesley, Vassar and Smith, the modern Hygiene department does not confine itself to set mechanical drills but offers the students instruction in games, folk-dancing, aesthetic dancing and in a great variety of outdoor sports.

Wellesley has sufficient instructors and courses in the Hygiene department to provide efficient instruction. Freshmen and sophomores are required to take two practical periods of gymnasium work each week, while every freshman must attend a lecture on Hygiene once a week through the year. In this course, to quote, "Stress is laid (1) on the applicability of hygienic practice in the immediate situations of college life, and (2) on the development of habits of posture and movement as a phase of education. The underlying physiology is reduced to the least amount needed for scientific justification of the practice of personal hygiene." This would seem to be a good introduction, and one which might stimulate to the election of courses in Physiology. Yet with two courses of Physiology and Anatomy in the department of Zoology, the former was elected by just 7, the latter by only 1 of the class of 1915. If a student plans to spend five years for her Bachelor's degree, she may at the same time obtain the certificate of the department of Hygiene, as a teacher of Hygiene.

Smith College has fewer instructors but more courses in Hygiene than Wellesley, there being eight instructors to Wellesley's twelve, and fourteen courses to Wellesley's ten.

Every under-classman is required to take four hours of practical gymnastics, including one period of folk dancing for freshmen and one period of aesthetic gymnastics for sophomores. In addition, at least six Hygiene lectures on "the relation of personal conduct to health and efficiency" are required of freshmen, and of seniors a course of five or six lectures in special Physiology and Hygiene.

The Vassar department of Physiology and Hygiene, with two instructors, requires three hours of practical gymnastics of all freshmen and sophomores. Freshmen must also attend six lectures upon "personal conduct as affecting health," including a discussion of "dress, exercise, bathing, food, work, rest." Such lectures, whether given at Vassar, Smith or Wellesley, might conceivably become mere articulations of what one must or must not do; but if the statements made are proved by straight experimental evidence in clear and simple form, the students might also come to realize the importance of "scientific" fact. Though the Vassar department is limited to two courses, both appear valuable. The course in Advanced Human Physiology was selected by 21 students of the class of 1915, while the other, a semester course in Municipal and House Sanitation, was elected by 72 students. These three departments of Hygiene thus present important features which entitle them to a high standing in the college curriculum.

The Vocational in the Curriculum

At present it is a controversial matter whether or not the College of Arts should offer definite vocational training. Wellesley has two departments in which, owing to advanced certificate work, this vocational motive plays a particularly evident rôle. Although these special courses are not an intrinsic part of the collegiate work, they must exert an influence.

The Hygiene department offers its certificate for a special two-year course. To quote, "this course is especially designed for the training of teachers of Hygiene. Candidates must meet the requirements prescribed for admission to the freshman class, including Chemistry or Physics, and must be without organic disease or serious functional disorder. A keen sense of rhythm is necessary." A total of eighteen courses, both theoretical and practical, was offered in 1914-1915.

The department of Music also offers a special certificate. The important relation of the undergraduates to this department has been previously noted. On the other hand, those students not registered for the degree of Bachelor of Arts but who wish to obtain the department's certificate must meet the requirements of the freshman class, must be grounded in

the fundamentals of the work chosen, and, in addition to several regulations, "must also take from six to nine hours per week of academic work, including Musical Theory." In general a period of four years is necessary to complete the course.

At Smith and Vassar no special certificates are given in the departments of Hygiene and Music, yet ample opportunity is afforded in practical as well as in theoretical work. In fact the Music departments of all three colleges are small conservatories of Music, efficiently directed and offering the student both individual and ensemble training. Similarly the departments of Art seek to offer practical work, Smith allowing four 6-hour courses, with 2-hours of credit; and Wellesley four 1-hour courses in studio practice.

All three colleges, moreover, possess scattered courses of a practical nature, which if properly applied to the student's "special interest" have a direct vocational bearing. Evidently if a student plans to do her future work in applied science, her advanced laboratory courses may well be termed "vocational."

Any vocational emphasis which exists at Wellesley in the department of Education, however, is chiefly in graduate courses. These include a course in secondary and two in kindergarten education, on completion of which the student is "amply qualified to conduct kindergartens." The collegiate work has already been discussed. Excepting "Principles and Problems of Religious Education," the only advanced educational course at Wellesley is Problems in Education, elected by but 5 members of the class of 1915. At Smith, however, the two-semester course on Principles and Problems of Contemporary Education, affords opportunity for school visiting and was taken by approximately one-third the juniors and seniors.

As illustrative of vocational tendencies in the English department, Vassar plans, in 1915-1916, a course in critical writing with more than usual emphasis on the journalistic side because the instructor has been engaged in newspaper work.

The department of Spoken English at Smith and Vassar and of Reading and Speaking at Wellesley may perhaps be considered as having vocational value. For, as noted by the Wellesley College News, this department has changed from the cultivation of an "artificial manner and a store of parlor tricks" to practical study and appreciation of the art of speaking and reading; and both the voice and body are trained. At Smith and Vassar extemporaneous speaking is emphasized, and Vassar gives special attention to "story-telling."

The beginnings of a training in social service are exemplified at Smith, where Sociology ranks equally with Economics,

by the courses in Charities and Corrections and Present Social Problems; and at Vassar by the course in Charities and Corrections.

With reference to the Botany department too, some may be surprised to learn that at Smith 24 juniors and seniors elected a course in Horticulture and 9 the course in Landscape Gardening, both clearly suggestive of the vocational, while Vassar, in 1916-1917, offers a 3-hour advanced course in Botany in which landscape gardening will be taken up. In another field, the Wellesley department offers a 1-hour course on Bacteria, Yeasts and Moulds in the Home. The Smith department goes so far in its announcement of courses as to advise regarding those essential to vocational training.

Certain courses in Chemistry similarly have vocational applications: the course at Wellesley, for instance, on Air, Water and Food Analysis, though this was taken by only 5 students in the class of 1915. Smith offers Sanitary Chemistry and Lectures on the application of chemical facts and principles to common life. Vassar offers Physiological Chemistry, Food Analysis and Applications of Chemistry to Food and Sanitation. The latter course is "designed to give a basis for intelligent consideration of the chemical aspect of problems involved in public and private Hygiene. Especially valuable for those interested in Sociology and wishing to equip themselves for public service." Each of these courses was elected by 10 members of the class of 1915. Courses in Physiology have already been emphasized in connection with the student's curricula.

Vocational training for a career in the home receives a very slight and scattered emphasis. Andrews in his recent study of approximately 450 colleges and universities in the United States which receive women students, found 257, or 57% giving, or soon to be giving, courses of instruction in home economics (1). His classification of courses bearing on preparation for the home, however, is very broad, and includes such subjects as music, education and sociology. Andrews mentions, for example, three courses at Wellesley, the two semester courses in Social Economics and the one in Economics of Consumption. Despite the statement accompanying the latter course that "the function of women in directing household expenditures will be considered throughout," these courses were selected by only 18% of the students electing work in the department according to statistics of the class of 1915. The suggestion of Andrews that a department of Household Administration be established should be seriously considered by our women's Colleges of Arts. More adequate preparation might thus be given those students who almost

immediately devote themselves to the "domestic" vocation, after their four years at college.

Thus far the larger Colleges of Arts for women emphasize the vocational motive only in so far as several special departments and several applied courses offer bases for later professional work, with here and there perhaps a hint of home training. And while these applied courses are elected by small percentages of the students, these per cents. should increase as the student herself develops and is able to appreciate vocational opportunities which will function in real life.

It should be advantageous to these institutions to examine carefully, with a view to partial incorporation if feasible, the curricula of such a college as Simmons with her four-year programmes in Household Economics, Secretarial Studies, Library Science, General Science, Social Work and Industrial Teaching. As early as 1910, a Committee of the New York Branch of the Association of Collegiate Alumnae recommended that "the curriculum of women's colleges be modified in the direction of vocations by the introduction of required courses in Hygiene, Biology, and Bacteriology, and applied Sociology—legislation, property, social and domestic relations from the point of view of women's interests; and that further elective courses in physical and psychological Hygiene of childhood and in Political Science be provided." This admirable statement does not imply a revolution, but simply the addition or substitution of important applied courses, which, correlated to theory, will give to one type of student the scientific education necessary for home technique and to others the working basis for whatever technical work they may later pursue as a vocation.

The Election of Courses

The important vocations open to women are readily tabulated, and some understanding reached regarding what collegiate courses a student should follow in preparation for her vocation. The momentous question which the modern college must face is: does the student know what she wants to elect, and if not, how is she to find out? Faculty and curriculum are available, but it is doubtful whether adequate "aids" are given students in their selection of courses.

There are several existent methods for assisting the student to elect. The system of faculty advisers is in general use. At Wellesley and Vassar each freshman is assigned to a faculty member, acting as her adviser during the college year. At Smith the students are advised in connection with the "course of study," but "while all possible aid and direction will be given by the Class Officers, the students will be held

responsible for errors in their choice of studies." The Class Officers constitute a board of ten members, the dean as chairman, a faculty member for advanced standing and two faculty members for each college class. According to President Burton, "it is absolutely essential to real education that every student know some teacher and that every instructor come in contact with his students." But the method of faculty advisers is efficient only when there is a clear comprehension of its purpose by both sides.

Upper-class students are also utilized as freshmen advisers. At Wellesley nearly all freshmen are lodged in the Village, and a group of seniors termed "Village Seniors" sacrifice their homes on the campus to live in the Village and offer any assistance they may require. This system is under the control of the Student Government Association. Beginning in September, 1915, a total of 100 freshmen advisers will be chosen from the two upper classes at Smith College. This latter method may offer the same difficulty as with faculty advisers, in that a freshman may become aware of the fact that somebody else has an adviser and that she also is "supposed to have." Both systems largely depend on the attitudes of the individuals concerned, a very variable factor.

There are other evidences of the beginnings of an adequate vocational guidance in the student's electives. At Vassar the "Department of Wardens" promises to take the lead in initiating vocational motives. The Wardens are dormitory officials and, with the Head Warden, form the department of Wardens. To quote the bulletin, "nothing that concerns the student is foreign to them (the wardens) and they keep in view the need of intellectual inspiration as well as the awakening of a social moral spirit." Vassar hopes that this department will remedy the "just complaints" for the "neglect of the individual;" and at present this department is formulating a vocational plan. Meanwhile the Student Government Executive Board has taken a census to find in what particular subjects the students are interested, has classified the results, and grouped the students with regard to the discussion of subjects of mutual interest. This in itself is important and is one of many proofs of the responsibility which the Students' Association may assume.

The plan of a definite vocational adviser is certainly an innovation in colleges for women, but the system should expand and become a dominant force in student guidance. The vocational counsellor is defined by Williams as "the newest official in the college world for determining in what way the college stands in need of improvement as a developer of abilities, interests and viewpoints required for the meeting of the

needs of the world" (31). Possibly one of the factors in this expansion should be sub-student committees receiving special vocational instruction, for there is nothing pertaining to the student body which does not receive its best stimulus through "popular" expression, occasioned through a group of students recognized as influential in the college community.

The vocational adviser for Wellesley, Smith and Mount Holyoke is Miss Florence Jackson, director of the Department of Vocational Advice and Appointment of the Women's Educational and Industrial Union in Boston. This method includes a certain number of meetings arranged to give talks to students concerning different vocations. Such talks are not necessarily given by Miss Jackson, but through her, by persons representing various vocations. Thus an item of the *Wellesley College News,* March fourth, reads "Vocational guidance meeting on Tuesday, March 9. The subject will be 'Secretarial Work,' and one of the speakers will be Miss Marguerite Kimball, secretary to Bishop Lawrence." This is a wise policy as one of the requisites of good vocational advice is an intimate knowledge of the vocations. Individual problems are attended to, moreover, by reserving several hours after each talk for consultations between speaker and students, while definite office hours are held by Miss Jackson.

At some later date this plan may be supplemented by careful vocational guidance in the high school. Davis, in his recent study of the Grand Rapids plan, asserts "that during the last year of a student's high-school experience his attention should be directed along sociological lines from the viewpoint of his chosen vocation" (10). He further shows to what an extent the vocational may naturally function in the daily curriculum. Collegiate English departments, for example, might well apply to "freshman themes" the systematic vocational guidance so carefully worked into the English compositions of the secondary school by this Grand Rapids plan. Nor is English Composition the only department which may thus be vitalized.

The most essential need is some means of presenting to all students all collegiate values. The freshman should be in receptive "mood" for such advice, for she has entered a radically new environment and must undergo a process of adjustment until she is able to view her electives from the perspective of both past and future knowledge-accumulations. Too often, in the case of freshmen and more advanced students, one notes "the line of least resistance," or the election of "studies" minus the thought of "study," or the pursuit of studies "for which nature endowed them with rather meager or no capacity." The modern college laments "a general lack

of information and considerable positive misunderstanding on the part of the students of the entering class respecting administrative, social and academic matters, and this defect attributes to the failure of many students to appreciate and profit by the college course."

The freshman year is devoted almost exclusively to definite requirements, such as English, Mathematics, Latin, modern languages, and becomes essentially the continuation and rounding off of high-school subjects. For this reason the student at the end of the freshman year remains unacquainted with the "elective" curriculum, and, lacking this intelligent basis, is hardly more capable of wise elections than she was upon college entrance. It is practical and efficient, as Ewer suggests, to afford her "preliminary glimpses of fields which the student does not ordinarily reach in her first year, particularly Philosophy, Psychology, Education and Sociology." Such glimpses should lead each student to new interests. These interests might be "experimented" with in sophomore electives. In sequence, when specialization as an upper-classman arrives and "man seems to pass over from being a mere knowing animal into a thinking being," more students would have a definite idea of where to "major."

Among the most successful experiments with this problem is the course in "College Life" developed by Ewer at Reed College (12). This practical freshman course includes "the development of higher education," "the meaning of education, with special reference to the problem of cultural and vocational education" and the curriculum. The first-year student is thus acquainted with the problems, curriculum and status of his college, and its broader relations to life. According to Ewer, this includes: (1) a survey of studies not included in the curriculum of the freshman year; (2) information of certain methods of study employed more or less throughout the college year; (3) a provision for the discussion of college questions. His two-year test of this course and student opinion enable him to state that "systematic instruction in matters of College Life appears well worth while."

A similar course in the "aim, scope and value of a college course" for "freshman orientation" is required at Brown University. This course first discusses the right attitude toward studies, the lecture system, attendance upon classes, examinations, methods of note-taking, arrangement of courses, honors, prizes, student finances, college institutions, relations with the faculty, freshmen advisers, facilities for study at the university and in the city, student activities and conduct, health, and the use of the library. It then develops a comprehensive view of the extent, contents and purpose of the

academic curriculum. It is intended that this be "without regard to the departmental lines as they are more or less accidentally drawn at Brown, although the fields of all departments should be covered; that the lectures should undertake to explain to the freshman the scope, value and extrinsic relations of the subjects discussed; that they should avoid the attempt to give an epitome of any course, or to develop a particular phase of it instead of a general explanation of its content; and that reference to particular courses or teachers be as far as possible avoided." This most practical Brown plan consists of twenty-eight lectures, extending through the year; and the speakers are not limited to the college faculty. The lectures on the "College" by President Burton may become the nucleus for a similar course at Smith. This method of direct, concentrated presentation tends to eliminate present wastes. It is the "shortcut" to that necessary information regarding "college studentship and citizenship" which "was ordinarily left to the student's casual acquaintance."

Another important means of broadening the student's attitudes is the Vassar system which allows attendance upon lectures which require no preparation and offer no credit. Corresponding to the German university-system of Auditors, this might well be introduced in these colleges for their juniors and seniors, for students may be able to attend profitable lectures on subjects of special interest, and yet be unable to do outside reading, prepare papers and undergo examinations. In the class of 1915, a total of 87 Vassar students so attended lectures in fifteen departments. There were 16 auditors in four psychological courses, 13 in three courses in Physiology, 10 in nine courses in History, 7 in five English courses and 7 in four Geology courses. The remainder were scattered among the departments of Art, Music, French, Latin, Biblical History, Economics, Chemistry, Physics and Zoölogy.

In conclusion, a course initiating the first-year student in College Life seems to be a primary factor in solving the difficulties which hedge the "elective system." If in addition to such instruction, there is correlation with an organized system of faculty advisers, coöperation with the Student Government Association and significant work done for the stimulation of interest in the vocational fields, a marked change in the student's attitude toward the curriculum and a widening of her elective field must necessarily ensue.

Conclusion

Certain points in a comparative study of this nature may well receive special emphasis. There are, however, certain

relatively intangible factors which influence the statistical investigation of student electives, in the absence of adequate elective preferences. The election may be strongly influenced by preferences for certain faculty members. Again, every college has several courses accepted as "easy." These may be elected both by the student who is not inclined to work any harder than necessary and the student who rightly elects such a course in connection with others requiring more time and attention. A third factor is the elective influence one student may exert over her friend who is, so to speak, in a passive state of elective-attention.

Certain constructive suggestions looking towards a definite basis for the elective system are, first, a required course in College Life, descriptive of the curriculum but emphasizing scientific and vocational motives; second, an adequate system of faculty advisers to bring the student into personal relationship; finally, organized vocational guidance.

Exclusive of the Wellesley departments which grant special certificates and involve added periods of study, the "vocational" plays a minor part in the curricula of Wellesley, Smith and Vassar colleges. The vocational factor at present relates only to certain special departments and certain applied courses which the student may elect in preparation for her chosen vocation.

There is a clear lack of interest in the study of Education. At neither Wellesley nor Smith is Education elected by at least one-half the students of a given class, while the majority of those electing in the department limit themselves to a year's work. Vassar has merely a semester course hidden away in the department of Philosophy. The important practical branch of Educational Hygiene, for instance, seems entirely neglected at these colleges.

Vassar leads in the emphasis on Psychology, with more than six times the number of courses elected at Wellesley and Smith, exclusive of their requirement. On the other hand, the total number of courses, exclusive of requirements, elected in Philosophy at Wellesley approximates those of Smith and Vassar combined.

With the exception of a few courses at Smith, the science of Sociology is sadly neglected. The perusal of any good text of Sociology should eliminate the fallacy that other subjects of less value should have precedence in the quantity and quality of courses.

Little importance is yet attached to the Science departments. This contention is supported by the lack of concentration in the sciences, by the slight attention devoted by students of

Phi Beta Kappa grade and by the relatively small percentage of students electing science work beyond the requirements.

Preliminary to the statistical statement of the actual courses elected, a tabulation was made to obtain some suggestion of departmental preferences. The results showed an excess in the numbers of courses and faculty members in English, History, German and French. Later investigation corroborated this preliminary evidence of an over-emphasis upon language and literature.

The number of year-hours of required subjects definitely designated is approximately twenty-one at all three colleges. Both Wellesley and Smith require eighteen year-hours of concentration. Statistics, however, reveal that Vassar, with no such requirement, shows only a small increase in the per cent. of "scattering." In an "Auditor" system, 42% of Vassar students participate, the largest number in Psychology and Physiology.

A study of the faculties of the different colleges shows a decided preponderance of women teachers. This is surprising, for it does not follow that college women must for the most part be also taught by members of their own sex. This may tend to have a minimum, perhaps even negative, effect upon the student, rather than the desired maximum. Cleveland, in his statistical study of the preponderance of female teachers, concludes that "after puberty male influence is necessary for the proper development of both boys and girls" (9). A more adequate balance would seem to be the approximate equalization of the sexes.

Finally, the Student Government Association may again be mentioned as an efficient agent in college education. President Meiklejohn rather thinks there is too much talk, too much meddling and too much legislation about student activities; if there is one thing which lessens the interest of a junior or senior, it is the being "told" what she must do, when to her and to other students different decisions appear more feasible. The best stimuli for general student response originate in the student body, and this Association represents the organized initiative of the student community. Its constructive function, the expression of combined student opinion, may be effectively applied to the problems of the elective curriculum.

Bibliography

1. Andrews, B. R. Education for the Home. *U. S. Bureau of Education Bulletin, whole no.* 610-613. Part III—Colleges and Universities. 1915.
2. Avery, S. How to reach the individual student in our colleges. *N. E. A. Addresses and Proceedings,* 1912, 783-789, p.

3. Association of Collegiate Alumnae. Vocational Training. *Bulletin No.* 1. 1913, 137 p.
4. Briggs, L. B. College Life. Houghton Mifflin Co., Boston, 1904, 124 p.
5. Bulletin of Smith College, 1914-1915. Smith College, Northampton, Mass., Oct. 1914, 163 p.
6. Burton, M. L. President's Report. *Smith College Bulletin.* Smith College, Northampton, Mass., Dec. 1913, 74 p.
7. Butler, N. M. The Meaning of Education. Macmillan Co., N. Y., 1905, 226 p.
8. Carnegie Foundation for the Advancement of Teaching. Eighth Annual Report of the President and of the Treasurer. Improvements in the Financial Status of College Teachers. College Catalogues, N. Y., 1913, 98-124 p.
9. Cleveland, A. A. The Predominance of Female Teachers. *Ped. Sem.* 1905, Vol. 12, 289-303 p.
10. Davis, J. B. Vocational and Moral Guidance. Ginn & Co., N. Y., 1914, 303 p.
11. Dewey, J. The Course of Study. *Cyclopedia of Education, Monroe.* 1911, Vol. 2, page 220.
12. Ewer, B. C. College Life as a College Study. *Ed. Rev.,* 1913, Vol. 46, 390-394 p.
13. Ferry, F. C. Some tables of Student Hours of Instruction. *Science.* 1913, Vol. 38, 584-589 p.
14. Foster, W. T. Administration of the College Curriculum. Houghton Mifflin Co., Boston, 1911, 350 p.
15. —— ——. Reed College. *School Rev.* 1915, Vol. 23, 97-104 p.
16. General Education Board 1902-1914. General Education Board, N. Y., 1915, 103-159 p.
17. Hall, G. S. The Function of Music in the College Curriculum. *Ped. Sem.,* 1908, Vol. 15, 117-126 p.
18. Harper, W. R. The Trend in Higher Education. The University of Chicago Press, Chicago, 1905, 390 p.
19. Hyde, W. D. The College Man and College Woman. Houghton Mifflin Co., Boston, 1906, 333 p.
20. Lefevre, A. The Organization and Administration of a State's Institutions of Higher Education. Von Boeckmann-Jones. Austin, Texas, 1914, 542 p.
21. Magni, J. The Decline of the Classics and their Place in Future Curricula. *Ped. Sem.,* 1913, Vol. 20, 23-44 p.
22. Mead, A. R. Personal Relations with Individual Students. *N. E. A. Addresses and Proceedings,* 1912, 790-803 p.
23. National Council of Education. Economy of Time in Education. *N. E. A. Addresses and Proceedings,* 1912, 507-517 p.
24. Strayer, G. D. and Thorndike, E. L. Educational Administration. The Macmillan Co., N. Y., 1913, 188-203 p.
25. Thwing, C. F. The American College—what it is and what it ought to be. The Platt & Peck Co., N. Y., 1914, 288 p.
26. —— ——. College Administration. The Century Co., N. Y., 1900, 321 p.
27. Weeks, A. D. The Education of Tomorrow. Sturgis & Walton Co., N. Y., 1913, 232 p.
28. Wellesley College Bulletin 1914-1915. Wellesley College, Wellesley, Mass., Jan. 1915, 184 p.
29. West, A. F. American Liberal Education. Charles Scribner's Sons, N. Y., 1907, 135 p.
30. Westgate, L. G. The Efficiency of the College Course. *Ed. Rev.,* 1912, Vol. 43, 134-154 p.

31. Williams, C. W. The Scientific Study of the College Student. *Science,* 1913, Vol. 38, 114-120 p.
32. Vassar College Bulletin 1914-1915. Vassar College, Poughkeepsie, N. Y., Dec. 1914, 163 p.
33. Vocational Bureaus for Educated Women. *Survey,* 1912, Vol. 28, 681-682 p.

HISTORY OF EDUCATION IN STATE NORMAL SCHOOLS*

By C. L. Robbins, New York Training School for Teachers

As the state normal school is almost universally an institution with a short course (ordinarily two years) definitely intended to give its students a mastery of such knowledge and technique as will fit them to teach efficiently in the elementary school, it is not to be expected that the curriculum shall contain much material that does not bear very directly upon that work. Its cultural subjects are almost certain to parallel those of the elementary school while its professional work is likely to bear very immediately upon the technique of teaching or learning. To this general tendency there is one frequent and almost universal exception, the course in history of education, a subject which cannot well have the same specific professional value as methods of teaching, educational psychology, or principles of education.

Of ninety-eight catalogs consulted in this study, all but one show that history of education is one of the required or elective subjects in the course for teachers in elementary schools. In the bare fact of offering some kind of course in this subject all sections of the country agree, varying needs of North, South, East and West making no appreciable difference in the presence of a course called history of education, history and principles of education, history and philosophy of education, or evolution of education.

Amount and Distribution of Time.—Nothing could show the lack of uniformity among American normal schools more clearly than the extreme variability in the amount of time given to the study of the history of education, although the figures here given probably over-emphasize the general fact of variation. The accompanying table shows the amount of

* This study is based upon recent catalogs of ninety-eight state normal schools, distributed as follows: Alabama, 1; Arizona, 1; California, 3; Colorado, 1; Connecticut, 2; Georgia, 2; Idaho, 1; Illinois, 3; Indiana, 1; Iowa, 1; Kansas, 1; Kentucky, 2; Louisiana, 1; Maine, 5; Maryland, 2; Massachusetts, 4; Michigan, 3; Minnesota, 4; Missouri, 4; Montana, 1; Nebraska, 1; New Hampshire, 1; New Jersey, 3; New Mexico, 1; New York, 9; North Carolina, 1; North Dakota, 3; Ohio, 1; Oklahoma, 6; Oregon, 1; Pennsylvania, 5; Rhode Island, 1; South Carolina, 1; South Dakota, 1; Texas, 2; Utah, 1; Vermont, 2; Virginia, 2; Washington, 2; West Virginia, 3; Wisconsin, 8.

time allotted in two ways, by weeks and by total number of hours. In each case there is a clearly marked central tendency, about eighteen or nineteen weeks, that is, a half-year, or a little less than eighty hours. While comparatively few catalogs show the length of the recitation period, such as do make it seem reasonable to assume a general prevalence of the forty-five-minute period. The disagreement in total number of cases is due to the fact that some catalogs show clearly only the total number of hours while others show only the total number of weeks or the fraction of a year without any definite indication of the number of periods per week.

The reasons for lack of uniformity in the amount of time offered or required are probably to be found in such factors as the following: estimated value of the subject; time available; amount of material to be covered, depending largely upon the text-book selected; method of presentation; and preparation of the teacher.

A comparison with Ruediger's study on "Recent tendencies in the normal schools of the United States" (*Educational Review*, March, 1907), which shows a median of 13.7 weeks offered (hours not given), indicates a decided increase in the amount of time given the subject, although his study shows a decrease from 19.5 weeks in 1895 to 13.7 in 1905.

TABLE SHOWING AMOUNT AND DISTRIBUTION OF TIME

Weeks	No. of schools	Hours	No. of schools
0	1	0	1
6	1	18	2
9	1	24	1
10	2	36	3
12	19	50	2
13	1	54	8 (1)
18	18 (2)	60	15 (1)
19	2	65	1
20	16	72	3
24	16 (2)	76	1
36	2 (9)	90	6 (9)
60	(1)	95	1
72	(1)	96	1
108	(1)	100	15
Total	79+16—3 (overlapping)	108	1
		120	11 (2)
		144	1 (1)
		234	(1)
		Total	73+15—2 (overlapping)

Median of time offered counting required and elective, 20 weeks or 91.7 hours.

Median required (counting cases where all work is optional in the number for zero in time), 18.4 weeks or 63.8 hours.

Median required (counting only the schools where some work is required), 18.8 weeks, or 76 hours.

Average (counting only required work), 18.4 weeks, or 78.9 hours.

The numbers in parentheses indicate cases where the work is elective. Some schools offer both elective and required work; hence the overlapping.

Most schools offer no courses in addition to those required, but there are a few which offer a large amount of additional elective work. The Indiana State Normal School (Terre Haute), for example, offers four quarters of twelve weeks each, although but one quarter is required in the two-year course and two quarters in the three-year course. The Kansas State Normal at Emporia offers five historical courses, amounting to more than 200 hours. The Colorado State Normal College (Greeley) offers six two-hour courses running through two years.

In view of the decrease in amount of time found by Ruediger and the low median (13.7 weeks), it is remarkable to discover that catalogs for 1912-13 show that almost three-fourth of the schools (72.8%) now offer a half-year or more of history of education; while more than nine-tenths (91.8%) offer fifty hours or more; and more than three-fourths (76.6%) require a like amount. Evidently the tendency to offer an exceedingly short course has been found unsatisfactory; or perhaps the scope and quality of the text-books appearing within the past eight or ten years have combined to give increased worth to the subject and create a demand for more time.

Aim and Value.—While the history of education can hardly be said to possess the direct preparatory value which educational psychology or method of teaching has, the foregoing facts in regard to time allotment show that it is not without a relatively high appreciation. More direct evidence of its actual or expected value may be found in the definite statements which many catalogs contain. Although many of the following statements must be taken as expressions of what is hoped for, rather than of what is demonstrably gained, they do show a deep appreciation of the value of the subject. No attempt will be made to evaluate such expressions of opinion as are here quoted, although it may be well to keep in mind the fact that the opinions are probably written either by teachers of the subject naturally inclined to magnify their office, or by administrators just as strongly disposed to make everything offered in the course of study seem of maximum value to the prospective student. The following quotations will show what the aim or value of the subject is supposed to be:

To enable the students to form a conception, in the light of history, of the meaning, function, nature, process, and means of education, and thereby to win a more complete mastery of the present world of educational theory and practice. Los Angeles, Cal.

Aid in determining the principles in great educational systems.

Help in appreciating the forces that operate in our own educational era. Florence, Ala.

Aims to present the cultural development of the race as it comes out in the growth of schools and in the development of thought as represented by the philosophers and educational reformers. Tempe, Ariz.

Education as a phase of a larger social process in which educational ideals, practices, and institutions are on the one hand determined by the progress of civilization, and on the other hand are determining factors in the evolution of society. Greeley, Colo.

The past as a basis for the interpretation of modern educational theory and practice. Athens, Ga.

The aim is to develop an historical background so that there may be an intelligent appreciation of the purposes of modern elementary education, a realization of the nature of modern democratic tendencies and of the social demands upon the school, and finally to awaken such broad educational interests as will prompt a life long study of social needs and educational readjustments to meet them. Milledgeville, Ga.

These courses aim (1) to make an interpretation of history in terms of man's conscious, rational effort to improve the total conditions of life and realize higher human ideals by means of education; (2) more specifically to trace the origin and development of educational ideals and processes in their relation to dominant life-problems; (3) to form more accurate standards of evaluation and practical judgment of present educational conditions; (4) to get inspiration and motive from the lives of persons who have made eminent contributions to the solution of the human problem in the field of education. Ill. State Normal Univ.

Body of knowledge and historical perspective. Emporia, Kansas.

To broaden the student's educational horizon by making him familiar with the leading educational theories and systems that have influenced our present ideals and practise. Cedar Falls, Iowa.

This subject is taken as a necessary part of the future teacher's professional equipment. "The right acquaintance with the best that has been thought and said touching one's profession is a liberal professional education." Lowell, Mass.

To lay a foundation for future reading and discussion. Bridgewater, Conn.

The purpose of this course is to trace the development of educational ideals and of actual educational institutions. When studied in this way History of Education should be of both academic and guidance value to the prospective teacher. Mount Pleasant, Mich.

To give the student an understanding of the development and evolution of our present complex school system. Cape Girardeau, Mo.

Relation between the individual and society and the development of both. Newark, N. J.

This course aims to give the pupils a clear view of the general trend or progress of education; to help them reason from effects to causes; to aid them in finding the significant principles in great educational systems; to make some acquaintance with the great educational reformers; and to appreciate in some measure the forces that are operative in our own era. Oswego, N. Y.

The purpose of this work is to reveal the value of education as a liberating and liberalizing factor in life, and the mission of the school as a transmitter of the cultural gains of humanity and as a stimulator of continual progress; to stir reverence for the mission and rights of childhood, as well as for the claims of every individual to the fullest educational advantages; in short, to deepen and widen

the professional perspective of students, to enable them to secure the foundation of an adequate science of pedagogy. Cleveland, Ohio.

The chief purpose of this course is to establish an understanding of present educational ideals, practices, tendencies, and problems. Edinboro, Pa.

To trace the development of modern educational thought and practice, and obtain such knowledge of educational systems as will enable them to avoid the errors of the past and adopt what is tried and true, to become inspired by the devoted lives of the world's great teachers and be led to form the noblest and best possible ideals of the work in which they propose to engage. East Stroudsburg, Pa.

The function of History of Education in the normal school is considered to be, to give the teacher as he is beginning his work an understanding of the purpose of education to-day, a realization of the social demands of the school, and an appreciation of the place and function of the school and of its work; to bring more clearly before him present educational needs and problems. Providence, R. I.

It is the purpose of this course, first, to form an idea of what have been the chief aims, materials, methods, and results of education from the time of the Greeks and Romans to the present time; second, to create a deep interest in the lives and works of great educators; third, to study, in the light of the past and present, legitimate aims, materials, methods, and results of present day education. Spearfish, S. Dak.

In summarizing these expressions of hope and belief, we find that history of education is supposed variously to serve the following purposes: (1) to broaden the student's educational horizon; (2) to show the place of education in evolution; (3) to give an understanding of what education is; (4) to develop interest in education and in the lives of great educators; (5) to furnish inspiration and motive; (6) to develop standards; (7) to aid in finding significant principles in educational systems; (8) to give an appreciation of the forces at work in modern education; (9) to enable the teacher to avoid the errors of the past and adopt the tried and true; (10) to stir reverence for the mission and rights of childhood; (11) to help the teacher reason from effects to causes; (12) to afford a liberal professional education; (13) to form the noblest and best possible ideals of the work of teaching; (14) and finally, with its academic and guidance value, to serve as a foundation for a science of pedagogy.

In contrast with this glowing summary of values may be quoted a passage from Suzzallo's discussion of "The Professional Use of History of Education" (1908).

"Of late there has been a growing scepticism among practical educational workers with regard to the worth of history of education. Considerable criticism has accompanied a belief that it has not been a sufficiently useful professional tool. In the minds of these critics it has not always been clear whether the difficulty is inherent in the subject matter, or in the manner in which such knowledge is treated. Certain it is that men who tend to see the whole present-day educational problem in the device and method of teach-

ing alone, are inclined to regard the whole subject as a rather heavy investment of energy for a very small return. On the other hand, it seems equally certain, that those who view the modern educational situation in its broader aspects, who see in education a large social movement interplaying with many other forces in our civilization, are inclined to regard the whole historic aspect of our professional work with more favor. The criticism of such would fall not upon the subject but upon its treatment. Whatever be the cause of the discontent, the problem of the worth of the history of education is before us." (p. 28.)

The foregoing summary from various catalogs, if misinterpreted as being *in toto* the belief of any individual, will offer devotees of formal logic an excellent example of the fallacy of composition. The subject may have all of those values, there may be persons who hope or believe that it has; but this study should not be taken as evidence of such a condition.

Nature of the Material.—Judging from the diversity of purpose shown in the foregoing discussion of aims and value, one could hardly expect to find uniformity in the courses offered. Such an *a priori* expectation of diversity is amply justified by the facts. The courses described in the various catalogs may be classified as follows:

1. The general course, usually covering European history, ancient, medieval, and modern, sometimes with a little source material, but ordinarily with only a text-book and library references to other secondary material. In some schools the general course treats only modern times.

2. A general course partly historical, emphasizing educational principles, philosophy, or problems.

3. Biography of great educators, often part of the general course but sometimes offered alone.

4. Educational classics.

5. (a) A course in American history of education. Some of this material is given in the general courses; but there are a few schools which offer a separate course covering this field.

(b) Special material on the history of education in the state in which the school is situated. Only a few catalogs mention the special use of such material.

6. Present-day educational problems treated historically,—to be distinguished from the course which is a general study of the field with special reference to problems.

7. Courses in special phases of education, such as the evolution of secondary schools, or the history of industrial education.

8. Comparative education, a special course in which French, German, English and American school systems are studied as part of the work in the department of history of education.

To the foregoing may be added

9. Incidental historical treatment of such subjects as arithmetic, reading, and grammar in courses not primarily historical.

If all these courses were offered in all schools, we should necessarily infer that a great deal of attention is given to adapting the material to individual needs or tastes. But as very few schools offer anything other than the general course no such inference can be made unless it be assumed that such a course is a kind of intellectual atmosphere essential to the life of every teacher. An explanation which seems to fit the situation, although it is not flattering to normal schools, is that these courses are generally given in imitation of the work done in university departments of education. Or it may be that a certain kind of material is easily available in text-books which can be placed in the hands of the pupils. While those persons who theorize on history of education generally agree that a course based upon the lives of great educators is not satisfactory as a general course, that it misses one of the most essential aims (that of showing education as the highest form of evolution and tracing the process of that evolution) few schools offer little if any work that is not biographical. Where the aim of the course is decidedly that of giving inspiration, the almost exclusive use of this type of material may perhaps be justified; but the historian must grieve over the sacrifice that is often made to secure inspiration. It is sad to find that the inspirational sort of material often needlessly lacks accuracy; and the accurate kind of history just as often fails to give inspiration. One of the best text-books now available demands the utmost enthusiasm on the part of the teacher to keep the students working at it; while another work, glowing in style and easy to read, has some howling historical inaccuracy on almost every page.

At the present time, so far as one may judge from the material at hand, the problem of adapting history of education to the needs of the elementary school teacher has not been solved. Indeed one might infer from reading normal school catalogs that there is no wide recognition of the principle that the material should be chosen to fit the needs of such teachers rather than those of teachers in general. It is probably true that the very same statement could be made of psychology, a subject generally regarded as much more directly necessary in the preparation of the teacher; but that, instead of being a justification of the present conditions, is rather the revelation of a widespread weakness in our scheme of training teachers. The situation is not without signs of improvement however, for quite a number of catalogs show that the teachers of history of education in normal schools are

breaking away from tradition and from the domination of the university department of education and are making very serious attempts to adapt both material and method to the needs of their own pupils. But the following fundamental questions are still unsettled: Should the course in history of education be primarily history with emphasis upon the ideas of development and progress with special attention to social, political, religious, and industrial conditions? Or should it be the handmaid of a course in principles or philosophy of education, serving as a background for psychology, principles of teaching, aims and values in education? Should the work be primarily to give inspiration or to furnish content, assuming that there is much useful material which has no easily available inspirational value? Should the material be regarded as liberal or strictly professional? Should the topics treated work back from the immediate problems of the present to their historical origins or should they be given in their own varied settings with little or no forced effort to make them bear upon such phases of education as seem of greatest importance at the present little moment in the world's history? Should there be a definite elimination of all those phases of the past that have apparently little definite and immediate bearing upon the work of elementary education or should a broader outlook govern the selection of material? For example, should we omit such topics as scholasticism, the rise and development of universities, medieval Saracenic education, the education of the aristocracy in England, Germany, and Italy, and the evolution of secondary education? Should the course generally offered include only modern education with special reference to our own national evolution, or should primitive, ancient, and medieval education be added? Should a few types be selected for intensive study, or should the view be general even though diverse?

In consequence of this array of unsolved problems it would seem wise for the administrators of normal schools and especially the teachers of history of education in such institutions to make a concerted effort to agree upon certain definite and attainable ends, to make a careful survey of the field and determine what material (regardless of courses offered in universities) will most effectively meet the needs of their students, and to look toward the emancipation of the subject from its present uncertain position in the curriculum. The making of a syllabus by a state board of education should have a tendency to free the subject from slavery to a textbook; but most of the work along this line, as far as the writer has been able to judge, has been very evidently a mere arranging of topics selected from a few textbooks which happened to be available

to the person charged with the making of the syllabus. Such work is futile except in the one respect that it gives the student a more or less definite idea of what he may expect in the state examination, a kind of knowledge that tends to make the passing of an examination seem more important than individual development.

The solution of the problem of material to be chosen in history of education lies almost entirely in the hands of the persons who teach the subject and of those who administer the normal schools, not in the hands of university teachers or even of state boards of education.

Method.—Without doubt the prevailing method in use in the treatment of history of education is study of some text-book followed by class recitation or discussion. Sometimes the teacher lectures; but the statements in catalogs show that normal schools at least have generally evolved beyond this ancient or medieval method of instruction. There is frequent mention of reports and required supplementary readings; and the keeping of note books is occasionally suggested.

But all this represents only the mechanical side of method. There is quite a little evidence that the teachers of this subject have some appreciation of method as an intellectual matter. We find fairly good grounds for believing that there is serious effort devoted toward breaking up the isolation which is likely to afflict history of education or any other subject of study which has a content clearly its own.

One very general method of establishing interrelations in the minds of the students is to refer frequently to present conditions and problems in such a way as to make facts learned from the text-book seem more than mere rubbish from the ruins of the past. In at least one catalog the work is represented as beginning with present problems and then proceeding into the past for explanation. Another form of this same process of correlation is seen within the subject-matter itself; for example, the attempt to relate the study of schools and education in a narrow sense with the social, political, religious, and industrial conditions of the period studied,—a kind of correlation which is mentioned so frequently that one is tempted to infer some common source which is variously quoted or paraphrased. Some schools add to this an emphasis upon cause and effect with an effort to trace effects back to their causes. Occasionally there is mention of the method of type studies, a form of teaching which the Herbartian will fit into the general scheme of correlation.

The conscious attempt to build up educational concepts is a type of method which might be inferred from many of the statements of aim, but which is rarely mentioned as an idea

which the teacher keeps or is to keep consistently in mind. In connection with the attempt to build up concepts we must not overlook the practice of drawing a definite moral or pedagogical lesson, a practice which clearly survives in spite of age-long advice not to spoil a story by making it the occasion for a formal moral lesson. A favorite form of the concept-to-be is seen in the aim "to show how different individuals, nations, and civilizations use educational forces in pushing forward progress and reform."

The syllabi furnished by state departments of education would lead to the belief that the treatment of the subject is or should be very clearly topical; but from the material afforded in the catalogs at hand one is hardly justified in believing that division into topics, sub-topics, etc., is carried very far or is used to any great extent, although a general or loose topical arrangement is necessary. There is, however, no evidence of the practice of anatomizing history; but in spite of the silence of the catalogs there may be teachers who require their pupils to analyze the material all the way from "Roman A" to "Arabic ninety-nine."

It is evident that history of education has developed no special technique of its own; that the method of teaching varies somewhat with variation in aim; that teaching in this field is probably good, bad, and indifferent just as it is in everything else—except observation, where it is almost uniformly bad. The pressing question is not one of method as much as of time and material, both affected by the maturity of the students. It is certainly futile to ape university methods when one has immature students who have but a few weeks to devote to this subject at best and who feel very keenly the pressure of other work. The needs and problems of the present must be emphasized; the past must not be permitted to monopolize the energy of the student in such a way as to make a mere antiquarian of him. And here lies the most difficult of all problems in history method. Shall the teacher seize a few present-day topics and trace them back to their historical beginnings? Or shall he take the past as he can find it, try to see it as it was, and set himself the task of tracing out how what was became what is? The first possibility is an attractive one; but very few people have as yet attempted to use that method. Its use would demand more time than is generally available, would necessitate a great change in the arrangement of subject matter, and might call for more skill and better preparation than most teachers of the subject now have. The second method is the easy way, the way of the textbook; it follows the plan that has almost always been used and will perhaps forever continue to be found practically

most usable if not theoretically most useful. Here is an excellent opportunity for experimental study of the value of various methods.

The Teaching Force.—While not much can be learned of the qualifications of teachers by reference to catalogs, there are two sets of facts that are revealed with a fair amount of clearness: academic preparation, as shown by degrees; and subjects taught in addition to the history of education.

In a total of ninety, it is found that there are eight persons who have no academic degree; twenty-two bachelors (including A.B., B.L., B.S., Ph.B., and B.E., the degree in arts numbering fourteen); thirty-seven masters (all being in arts except a single one in science); eighteen doctors (fourteen in philosophy, three in pedagogy, and one in science); and five in schools whose catalogs do not show what degrees the members of the faculty have received. This is a rather better showing of doctors than one would have expected,—20% of the total, while the percentage of masters and bachelors is respectively 41.1 and 24.4.

Ruediger found that in 1905 only 11% of the total teaching force in normal schools had the doctor's degree, 18%, the master's degree, and 17% the bachelor's. While the two sets of figures are not directly comparable (his referring to the whole teaching force and mine to teachers of history of education), it is certainly not going too far if one regards the comparison as showing what is generally optimistically believed,—that there is a marked tendency upward in the preparation of teachers in normal schools.

It is impossible to use a degree alone as evidence that the possessor is specially prepared to teach history of education. Even the doctor of philosophy may be less thoroughly prepared than the person who has no degree at all if the former has devoted himself exclusively to some field other than that which he is teaching and the latter has given some time to special preparation for his work. But we may get a certain amount of enlightenment by considering the work which teachers of history of education do in addition to teaching that subject. The school in which the teacher is permitted to confine his efforts to that field alone is hardly ever to be found, but in the great majority of cases other professional subjects are a regular, perhaps major, part of his work. To one who appreciates the difficulties under which many normal schools work, it is no great surprise to find that a single person often has the entire group of so-called pedagogical subjects, sometimes in addition to the duties of the principalship. Nor is it much of a shock to read such a list as the following, all given by one teacher: modern educational problems, current educa-

tional literature, history of modern education, Greek and Roman life and education, German and French life and education in the nineteenth and twentieth centuries, American education, principles of education, social education, moral and religious education, philosophy of education. It is hardly necessary to remark that not all are given in the same semester.

In contrast with this grouping of professional subjects we often find a combination of history of education with one or more of the following: mathematics, nature study, belles lettres, ethics, biology, geography, physical geography, agriculture, civics, history, and physiology. One of the most bizarre combinations is the following: "pedagogy, didactics, history of education, civics, child study, agriculture, and school management;" although the agglomeration of "biology, psychology, school hygiene, school economy, principles of teaching, and history of education" is about as fantastical.

Some of the combinations are not altogether unpromising, for example, history of education and history. In view of the very general practice of having history of education taught by a psychologist or a philosopher, one turns with a great deal of hope to the idea of having the subject taught by a person trained in history. But there are not enough cases of this kind to make one feel sure that it has happened from design rather than by chance. Where history of education is listed with "History and Social Science," as it is in the catalog of the St. Cloud, Minn., State Normal School, it seems reasonably certain that the arrangement is due to an idea in regard to what is fitting in the grouping of subjects, not to the mere chance of finding a history teacher who had less work than a psychologist.

From the evidence offered by statements in catalogs, it seems very clear that history of education is generally regarded as a subject which requires no special preparation, which anyone can teach if he has the ability to read such English as is found in the textbooks that are used. The almost universal practice of having the subject taught by a person whose major interest is in something else must militate very strongly against effective work. The traditional alliance of history of education with principles tends to obscure what history there is in the subject, while it tends to reduce to hodgepodge such little system as there is in what is commonly called "Principles of Education." Generally speaking the subject which has to suffer on account of the bias of the teacher or lack of preparation is history of education. The subject can never rise to a respectable level until it is regarded as requiring the very broadest preparation, with history and sociology as auxiliaries to the narrower field of education.

Conclusion.—This survey of conditions concerning the history of education as it now appears in state normal schools shows very clearly that the subject has not yet reached that high plane where any change must be for the worse, nor is its condition such that any change must be for the better. The opportunities for improvement are many and the need for change in some particulars is pressing.

First of all, the purpose of the subject in a course for elementary teachers should be understood and made to serve as a guide in the selection of material and the methods of teaching. Disregarding secondary purposes, we may say that the fundamental function of the subject is to give the student that increasingly broad outlook upon life and education which comes from a study of education as a phase of social evolution. This means negatively that we must not regard a knowledge of method, device, pedagogical principle, or school room practice as the most essential part of the work. The tendency to make the history of education a mere history of schools and teachers has made for narrowness rather than breadth of outlook.

The material selected should show a conscious effort to realize the foregoing purpose, but with the understanding that it is not necessary to go to the very beginning of time and elaborate every possible detail to develop breadth of outlook upon education as a social process. Much of the erudition that now encumbers textbooks should be branded as pedagogical piffle and left to those who have time and taste for it, leaving the overburdened and immature student time to acquire more profitable ideas. The needs of the elementary teacher should be kept in mind, but no misconception of immediate needs should be permitted to make the course a mere study of the elementary school as an isolated institution. In those states which have a significant educational history it may be worth while to magnify that phase of the work; and in every state, with a few notable exceptions, more attention might well be given American education.

If the teacher feels that biographical material has an inspirational value, the lives of a few great educators may be introduced in a supplementary way, rather for reading and appreciation than for mastery of detail. But the practice of offering a course in educational biography in place of that in history of education misses the mark almost entirely. The attempt to get the beginner to master four or five bald facts about each of forty or fifty more or less illustrious persons leads to the most pernicious practice of verbal memorizing and makes it almost if not altogether impossible to give a broad view of education.

In the ordinary two-year normal course offered graduates of four-year high schools, it would be much better to give a four-hour course for half of the second year showing the European background of American education and tracing the development of our system as a social institution than to attempt to run an intellectual Marathon from Ab the cave man to George, Mike, Ole, Heinrich, and Jean, the modern industrial workers. It is true that the teacher would be hampered by the lack of a textbook that would accomplish this for him, but the giving of such a course would demand a type of preparation which is not generally found where the teacher is permitted to follow one of the general works which now have the widest vogue.

Finally, the most urgent need of the present lies in just this phase of normal school administration, the securing of teachers who are adequately trained to teach this broadest of all subjects. We must abandon our idolatry of the textbook and adopt the policy of securing persons to teach history of education because they have enough faith in its value to secure adequate preparation for their work. As long as we let anyone, mathematician, taxidermist, biologist, or philosopher carry the work as an unwelcome addition to his own proper duties, we may expect only meager results. Great as is the need in this matter, the signs for the future are not unpromising. The change in the general character of the preparation of the teaching force as shown by the increasing percentage of masters and doctors is a most hopeful sign; and history of education, a subject which has been receiving increased recognition during the past seven or eight years, may reasonably be expected to benefit by the general upward tendency.

A CRITICAL STUDY OF RICE'S INVESTIGATION OF SPELLING EFFICIENCY

By W. F. Tidyman, New York University

Eighteen years ago (1897) Dr. J. M. Rice published the results of an extensive investigation of American school conditions. In this investigation mere personal opinion was to give way to objective facts as criteria of efficiency in spelling, and individual observation was to give way to a quantitative study of large numbers. To-day these are commonplace principles of investigation but at the time of this study they were nothing short of revolutionary. However, the study possesses more than an historical interest. It raises the fundamental problems of statistical study and hence a thoroughgoing criticism will yield suggestions concerning the essential characteristics, purpose, utility, and limitations of statistical study in general.

Aim.—The general aim of Rice's investigation was the study of school economy. The working hypothesis was: Is there a closer relation between spelling efficiency and maturity, and the personal equation of the teacher than there is between spelling efficiency and time spent, method, age, nationality, heredity and home environment? His particular problem was to find the relation between time spent (also method, age, nationality, heredity, home environment, maturity, personal equation of the teacher) and efficiency in spelling.

Means.—Inasmuch as this is the first study of its kind, the investigator had no historical material at his disposal except the popular controversies concerning the place and worth of spelling among school studies. To these he referred. The test material consisted of common English words variously presented. The first test comprised the following fifty words, the same for all grades: furniture, chandelier, curtain, bureau, bedstead, ceiling, cellar, entrance, building, tailor, doctor, physician, musician, beggar, plumber, superintendent, engine, conductor, brakeman, baggage, machinery, Tuesday, Wednesday, Saturday, February, autumn, breakfast, celery, cabbage, dough, biscuit, chocolate, vegetable, scholar, geography, strait, Chicago, Mississippi, Missouri, Alleghanies, independent, confectionery, different, addition, division, arithmetic, decimal, lead, steel, pigeon. In the second test words were written in sentences, such as, "While *running* he *slipped*," "The *weather*

is *changeable*." Fifty words were employed in the fourth and fifth year classes, and seventy-five in the sixth, seventh and eighth. In preparing the test special care was taken to avoid words whose pronunciation would reveal the spelling of the word, such as, tailor, doctor. The words were largely but not entirely the same for all grades. Third, an indirect test of spelling was made in the form of compositions. The compositions represented a story specially prepared for the purpose and were accompanied by a picture. The compositions were largely prepared under the personal supervision of the investigator; but some were prepared under the supervision of other persons who had the confidence of the investigator, and some, by the teachers alone.

These three tests were given to school children, both sexes, of the fourth, fifth, sixth, seventh and eighth years of public schools in various cities throughout the United States. The 33,000 children tested represented various nationalities and races. The first test was given to 16,000 children; the second, to 13,000; and the third, to nearly 4,000.

Method.—The data were collected by group tests and submitted to further statistical treatment.

Procedure.—The plan included the gathering of data by means of a questionnaire sent to superintendents throughout the United States, and a second test, administered under the personal supervision of the author. The researches were begun in February, 1895, and extended over a period of sixteen months.

The original plan provided for the first test only. This was given in the form of a questionnaire sent to superintendents of various cities throughout the United States. The questionnaire contained a list of fifty words, together with a set of questions concerning the methods employed by the teachers and particulars in regard to pupils, such as, age, sex, nationality, occupation of father. In all, twenty-one superintendents responded. Presumably the first test was administered orally by classroom teachers and the results sent to the experimenter. The results of the first test proved so variable (the averages in the fourth year classes ranged from 33% to 95.3%) that the investigator became suspicious of the method of presenting the words. As replies to his questions concerning the methods used by different teachers did not reveal the cause of the variability the author decided to undertake a special tour for the purpose of giving additional tests. The first test also revealed defects in the material, that is, the presence of words whose spelling could be disclosed by careful enunciation.

The second and third tests were given under the personal

supervision of the investigator. The tests were presented by the teacher. The sentences were dictated; and the compositions were read, with the appropriate picture before the pupils, to be reproduced by the pupils.

The papers of the second test were temporarily marked by the pupils and finally corrected by assistants to the investigator. The method of marking the papers of the first test is not recorded. Presumably, in these two tests, the number of rightly spelled words were regarded and counted as of equal value. The marks for spelling in composition were based on the actual number of words written by the child and represent the number of correctly spelled words per hundred. When the same word was misspelled more than once in an individual composition one error only was counted.

The relation between the column and sentence tests is shown for the several cities, by grades, in average percentages. The actual number of mistakes made are not recorded. (1, Table No. 1, p. 74.) The relation between minutes daily and the results for the several tests by school and grade are given in averages. No summary of the results showing this relation is presented. (Table No. 2, p. 74.) Three other tables (p. 84) present results showing the relations of age, "intelligence," nationality and environment to spelling ability. No graphs are used in showing results.

Results.—A summary of Table 1, "General Averages for Cities," shows that the column test is inferior to the sentence test in two grades (4th and 5th); superior in two grades (6th and 7th); equal(?) in one, the 8th. The amounts of difference are, respectively, + 10.7%, + 10.8%, — 5.2%, — 2.2%, + 0.2%. The algebraic sum, + 14.3%, is in favor of the sentence test and the average superiority is 2.86%.

The material for the study of the main problem of the investigation is given in Table No. 2, "Averages for Individual Schools" (p. 74). This problem is the relation between the minutes daily devoted to spelling and spelling efficiency, as indicated by the results of the several tests. The author concludes from inspection, it seems, that there is no relation. To show the facts even roughly, I selected the average marks in the sentence test, this being on the whole the most satisfactory, for each school (where comparison with minutes daily was possible) and compared these with the number of minutes daily devoted to the subject. Deviations from the average were recorded. A summary of the deviations shows: in one grade there are the same number of like and unlike deviations; in one grade the number of like exceeds the number of unlike deviations; in three grades the number of unlike exceeds the number of like deviations. In detail the results are:

for grade IV—8 like, 8 unlike and 1 zero pairs; V—8 like, 10 unlike pairs; VI—11 like, 8 unlike and 1 zero pairs; VII—5 like, 9 unlike and 1 zero pairs; VIII—4 like, 9 unlike pairs. In all there are 36 like, 46 unlike and 3 zero pairs.

The summary of results supports the previous statement, namely, that there is no relation between time spent and results.

A general statement of the results (pp. 72-91) concerning the relation of other factors to spelling efficiency follows: First, in regard to age, the author finds that the younger pupils are superior to the older, in each grade. This is another way of saying that the accelerated pupils surpass the retarded which, probably, no one would doubt. Second, there is a strikingly close relation between "intellect" and spelling efficiency. Third, the percentages of children of foreign parentage in relation to the general averages are, if not identical, slightly in favor of the foreign element. Fourth, the home environment of the homes of unskilled laborers and of those where a foreign language is used has little if any influence upon spelling efficiency. Fifth, there is no direct relation between methods and results (based upon data not presented). Sixth, the results indicate that maturity is the leading factor (p. 78). Seventh, the facts indicate that results are determined by the ability of the teacher (p. 90).

Conclusions. The conclusions which the investigator draws from his study are:

1. The amount of *time devoted* to instruction in spelling does not indicate the character of the results obtained (p. 80).
2. Age does not determine efficiency in spelling (p. 83).
3. The influence of nationality on spelling is nil (p. 85).
4. The influence of home environment exerts apparently little influence on spelling (p. 86).
5. There is no relation between methods and results (p. 88).
6. The influence of heredity is immaterial.
7. The results *seem* to indicate that maturity is the leading factor in learning to spell (p. 78).
8. In determining spelling efficiency the first place must be given to the personal equation of the teacher (p. 90).

In addition to the main conclusions of the investigation the author offers the following suggestions for pedagogical practice:

1. As to oral and written, column and sentence tests, the wise teacher will use as many methods and devices as possible in order to relieve the tedium and to meet the needs of individual children.
2. Under no circumstances should more than 15 minutes per day be devoted to spelling.
3. Words should be carefully graded (a) as to orthographical difficulties, and (b) as to the vocabulary of the child.
4. Precedence should be given to common words.
5. The course should be further abridged by excluding words that contain no catch difficulty.
6. Separate words that may be learned collectively (according to rule), and those which must be mastered individually.
7. Special drill should be given to a selected list of puzzling words.

Criticisms.—This initial study of spelling has aroused considerable discussion and criticism. The chief criticisms have related to the loose defining of issues (Suzzallo), laxity in control of conditions (Suzzallo), inequality of words (Thorndike and Buckingham), general procedure (Wallin), and conclusions (Wallin). For the most part they have been general or specialized and fragmentary. There has been no systematic effort to indicate the strong and weak points of the investigation.

Previous to 1897 in this country spelling theory and practice were controlled by no fixed scientific principles of general acceptance. Personal observation and experience were the criteria of right method. "One-idea" methods spread and were generally accepted, partly because no one possessed a sound set of principles for the critical evaluation of methods and devices. Waste, fads, blind acceptance of word formulas and diversity of practice followed, of necessity. For example, Dr. Rice found in one grade a variation of from nine to fifty minutes per day devoted to spelling, without appreciably different results. The same striking variations existed in method. For the solution of these problems Rice suggested and elaborated a scientific method of procedure. And whatever criticism of the execution of the work may be offered in light of the improved technique of pedagogical investigation, great credit must be given the author for initiating the use of scientific criteria in the study of spelling efficiency, where before there had been only opinion based on experience.

Aim.—The investigator was fortunate in the selection of his original problem. Previously, spelling efficiency had been studied in reference to results, as shown by teachers' marks. He raised the question of economy, that is, results in relation to time spent. His subordinate topics (which he sometimes tends to elevate to first place), namely, method, age, nationality, heredity, home environment, maturity and the personal equation, are also of great pedagogical significance.

But in addition to being worth while, the problem should be exactly defined. This was not done in case of the main problem, namely, "time spent" in relation to spelling efficiency, and we are left to assume that "time spent" means the amount of time per day devoted to spelling as a separate subject. Although the omission is relatively insignificant in case of such an obvious factor as "time spent" it becomes of immense importance when such factors as "the personality of the teacher" and "method" are introduced. The author loosely bunches all devices and methods of similar pedagogical title, as drill method, under one head. This step alone would rob his conclusion regarding method of much of its pedagog-

ical significance. This same criticism applies also to "heredity," "home environment" and the "personal equation of the teacher."

Means.—The reliability of results increases with the quantity of equally well selected words and with the variety of tests. But the number of words that can be successfully used is limited by administrative considerations and by the introduction of disturbing factors, such as fatigue. These facts are so obvious that this initial investigation did not fail to take them into consideration.

In addition to mere quantity, test material must submit also to qualitative conditions. These are (a) approximately equal familiarity, (b) graduated difficulty, and (c) uniformity for all grades. The first two may be arrived at experimentally in preliminary tests or by arbitrary selection on the basis of commonness. The investigator used the latter method. That he succeeded in a remarkable manner is shown by a study of the list of words that he used, but more emphatically by the performance of the pupils in the several tests. If the words had been too difficult, too small percentages would have occurred in the lower grades; if too easy, too large percentages in the upper grades. As a matter of fact, in the column test the minimum percentage was 33%, and only four schools fell below 40% in grade IV, while no school averaged above 90% in VIII; in the sentence test, no school fell below 53% in grade IV, and 90.3% was the highest percentage in VIII. As regards uniformity the column test met this condition completely; the sentence test, partly; and the composition test, most imperfectly.

The subjects were admirable selections both in quantity (33,000) and quality. A more representative group of American school children could probably not have been submitted to investigation. They were of diverse age, grade, sex, nationality, race and geographical distribution.

Method.—Experimental pedagogy knows two general methods, the experimental and the statistical. Here we are chiefly concerned with the latter. Some have attempted to limit the sphere of the statistical method to physical measurements, but it also has a place in mental and social measurements if its purpose, use and limitations are kept clearly in mind. Its purpose is the solution of problems which cannot be solved by experiment. These are (a) problems involving the determination of general group tendencies, in which large numbers must be measured in order to get significant results; (b) problems involving indirect control of conditions. Its successful use demands (1) The clear definition of the problem to be studied; (2) The limitation of the variations in a function

to variations due to changes in any one condition; (3) The control of conditions, (a) by the elimination of constant errors, and (b) by taking enough cases to balance chance variations due to uncontrollable causes; (4) The exact description of the status of a mental trait. The statistical method is limited to facts of quantitative determination. Qualitative facts are beyond its sphere. It is concerned with the what, not with the causes and conditions underlying phenomena. Because of these limitations of nature and purpose it cannot *settle* pedagogical questions. Many questions it cannot consider at all. Others it can consider but partially. At best, it contributes only a bit of evidence which is seldom, if ever, sufficient to decide the case. Failure to observe these fundamental facts is the chief criticism of the early statistical investigations.

The special mistakes in the early use of the statistical method have been first, the selection of problems to which it is not fitted; second, failure in maintaining conditions of control; third, the drawing of sweeping conclusions from partial evidence; fourth, having too much faith in statistical correlations the nature of which is questioned. Only the first, namely, the selection of problems to which the method is not fitted, will be mentioned under this topic. This mistake is, evidently, fundamental. The attempt to solve a good problem with a wrong method biases the whole conclusion. The criticism in question is illustrated in the author's attempt to treat "personality of the teacher" and "teaching method" by the statistical method. It should not be used in the first, and probably not in the second problem for the following reasons: first, they deal with subjective phenomena; second, they are difficult, if not impossible of definition; third, conditions are difficult, if not impossible, to control; fourth, there is a more satisfactory method for such problems, the experimental pedagogical method.

Procedure.—An investigation cannot be called scientific unless it fulfills the conditions of scientific procedure. That is, it must have three stages: first, a trial test, to familiarize the investigator with the plan and to locate unforeseen difficulties; second, a real test, to get data upon which to base the main results; third, the control test, to check the results obtained in the real test. The author provided neither for the trial test nor for the control test. The column test, to be sure, revealed certain defects of material, presentation, etc., and in so far it met the conditions of a trial test, but, that it did not completely do so is shown by the fact that it was unplanned, and that the results of the first test were incorporated into the results of the other tests and formed the basis for conclusions.

The lack of uniformity of presentation in the first test, which the author had the wisdom to discover, was not completely eliminated in the later tests. The class teachers who gave such unsatisfactory results in the first test, administered the second and third tests also. These were given under the "personal supervision" of the experimentor, to be sure; but, as he admits, it was impossible for him to be present in every class room during the entire course of the examination, and children could not be prevented from copying, especially where the rooms are furnished with double seats and where the teachers have no control over their classes. Other external conditions, which the author does not seem to have observed at all, but which must be taken into consideration in determining accurate measurements, are materials, seating, climate, time of year, time of day, varying subjective conditions of the investigator, etc. In addition to these conditions, which are external to the pupil, there are other important ones which may be called subjective. These are fatigue, motive, disposition and preparation. These were not considered, presumably, by the investigator and if they were controlled at all it was done unconsciously, by taking large numbers. It is practically certain that the author did not secure adequate control of the external and internal conditions just mentioned, together with the adequate control of the more important factors of age, sex, nationality, environment, grade and time spent sufficient to get highly exact and significant results from any one of them. At best, probable and general tendencies should be expected.

Checking should be done by disinterested and capable persons. The pupils themselves corrected the composition papers but these and, presumably, the other papers as well, were finally corrected by assistants to the investigator. The failure to take into account the varying difficulty of the words is criticised by Thorndike ('04, p. 8) who shows that, by an actual test with fifth grade children mistakes were made as follows: disappoint 37, necessary 42, changeable 42, better 3, because 1, picture 0. Buckingham ('13, p. 2) says, "To give these words equal weight in any test is to make inaccurate most of the conclusions based upon it."

The tabulation of results is the culmination of all that has gone before, and the basis of all that is to follow. Hence, deficiencies in tabulation affect the whole investigation. Two general principles control good tabulating and graphing: first, records of data should be accurate and complete; second, presentation should clearly show the significant relations between the factors studied. The author reports the results of his investigation neither accurately nor completely. They are

not complete in that: first, some of the material, such as the data on method, was not reported at all and second, because the figures which form the basis of the percentages are not given. The tabulating is not accurate, in that: first, tables of distribution, the only complete method of reporting the several measures of a variable fact, are not given; second, variability is completely ignored; third, the average is the only measure of central tendency, and since we do not have tables of distribution and the author does not indicate the nature of the same, we cannot be sure that the average is a reliable figure. Tabulation, in respect to showing relations between significant factors is defective in the following respects: first, in not presenting complete summaries (*e. g.*, Table No. 2); second, in showing relations inadequately (*e. g.*, relation of age to spelling efficiency); third, in failure to use graphs.

Results.—A complete statement of results should include both a general statement and a detailed summary of the important facts. The amount of detail is a variable quantity depending upon the importance of the topic, etc. The author in the main gives strong positive general statements of results. Detailed statements, also, are given frequently.

Since results depend for their validity upon the administration of the preceding part of the investigation, it cannot be expected, after the discussion of means, method and procedure just given, that they will have equal or detailed significance. In general we found that the material was on the whole fairly good; that the method was adequate for the solution of such problems as sex, age, time spent, etc., but was unfitted, for such problems as the personal equation of the teacher; that, as to procedure, the tests were poorly planned, inadequately controlled and incompletely and inaccurately tabulated. In view of these defects it follows that the results do not represent the facts accurately; that some are positively misleading; and that the more valid of them do not represent more than general tendencies.

Conclusions.—It is obvious that conclusions should follow from the results. In his final statements the author wisely separates the conclusions based upon data presented, or conclusions proper, from those inferences and suggestions for which no absolute proof has been given.

The validity of the conclusions may be affected first, by a misuse of the facts, taken at their face value, and, second, by inaccurate data. The investigator's chief mistake in the first place was in drawing a conclusion about subjective facts from a study of merely objective phenomena. In the discussion of method we made the distinction between objective and subjective facts, and saw that the statistical method is

limited to objective phenomena of quantitative determination. In the second place, the author's conclusions are vitiated by the deficiencies of the data upon which they are based. Such for example in the light of subsequent investigation is true in case of his conclusion: there is no relation between methods and results.

In view of the whole investigation, then, we must say that the author's conclusions regarding the relation between time spent, method, age, nationality, heredity, home environment, maturity, the personal equation of the teacher and spelling efficiency, are inadequate. At best the conclusions are suggestive and tentative. Probably the most surely founded is the one concerning the relation between time spent and spelling efficiency. The precise solution of these problems is a task for later investigators.

The investigation offers little of direct, positive value to pedagogical theory and practice. Its greatest and, indeed, its monumental service to education must be that it raised questions and stimulated experimentation and criticism of existing practices.

Bibliography

1. Rice, J. M. Scientific Management in Education. Chaps. V and VI: The Futility of the Spelling Grind. N. Y., Publishers Printing Co., 1913. 282 p.
2. Suzzallo, H. The Improvement of Instruction in Spelling. *Teachers College Record,* Vol. XIII, 1912, pp. 1-33.
3. Buckingham, B. R. Spelling Ability; Its Measurement and Distribution. *Teachers College Contributions to Education,* Series No. 50, 1913, p. 116.
4. Wallin, J. E. W. Spelling Efficiency in Relation to Age, Grade and Sex, and the Question of Transfer. Baltimore, Warwick & York, 1911. 91 p.

WANDERING SCHOLARS

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The wandering scholar of the later middle ages is a normal product of his time and environment. His mode of life was an outgrowth of several phases of earlier medieval life and requires indeed a special explanation only if one fails to strip away the intervening centuries and gives reign to the tendency of interpreting the past in terms of our present social, moral and intellectual milieu. Looking at our modern conveyances and locomotive facilities we are inclined to think that never in the world's history was there a time when travel was more widespread and a greater factor in education than at present. As historical research, however, slowly illuminates the dark pages of the past, it becomes apparent that this notion is a superficial one. History seems to point to the fact that the true age of traveling was at the close of the middle ages in what is known as the period of the renaissance. It was then that travel really meant education, not a mere pastime but a serious factor of life.

Quite early in Church history we meet with the wandering priest. Complaints against this class of the clergy are found as far back as the beginning of the fifth century. At that time Synesius, bishop of Ptolemais, alarmed by the growing tendency of the clergy toward a wandering life in preference to a settled living, attempted to stem the tide by obtaining a decree which prohibited the consecration by bishops of any priest who did not have the care of a parish. But in spite of numerous injunctions this class of the clergy continued to increase until at the time of the crusades, the *clerici vagantes,* as they were then called, came to be recognized as a permanent body. The pilgrimage, and later the crusades, had given a moral approval to a temporarily followed wandering life and led to its extensive adoption among the lower orders of the clergy.

The crusades also were largely responsible for that spirit of unrest that manifested itself as a general feature of the life of the late medieval centuries not only among those moved particularly by religious motives but among all classes of society. As a characteristic of the chivalric orders the trait is familiar to all. The wandering salesman and the traveling merchant are well known figures of an age in which commer-

cial correspondence, bill-brokers, and the varied forms of modern business life existed but in embryo. The craftsman, on the road with a purpose of improving his skill and discovering new methods and new wares, is a further illustration. Among the prosperous merchants the mere pleasure of traveling, and incidentally perhaps the desire for a temporary relaxation from rather rigid moral and religious ideals, if not practices, prompted many a one to adopt for a time a similar mode of life. Curiosity and the wish to acquire a more intimate knowledge of diverse manners and customs were frequently, then as now, motives joined to the former. To the man of learning, finally, owing to the scarcity of books, travel was a matter of necessity and, like the merchant, moreover, he often spent the greater part of his life in carrying his intellectual wares from court to court. But nothing perhaps gives us a better idea of the extent to which travel was carried on in that age than a glance at the rapid diffusion of the art of printing which, as Jacob Whimpheling tells us, not only converted all the towns of Germany, small as well as large, into intellectual workshops, but established itself by the aid of German printers within a few years in Italy, France, Spain, and even in the far North. At the end of the fifteenth century Rome alone is reported to have counted no less than 190 printing presses attended by German printers, while in the whole of Italy there were over 100 German printing establishments. In France and, according to Lopez de Vega, in Spain the spread was almost as rapid and assumed the same dimensions as in Italy. Printers from Cologne established the art in England and Holland. It was carried to Denmark and Sweden, Hungaria, Constantinople, and a Nuremberg physician tells of having met German printers even in the unhealthful island of St. Thomas.

An influential factor in the development of the wandering habit among students (which yet survives as a university tradition with the Teutonic peoples) was the relatively late foundation of universities in Germany. When the earliest universities came into existence Germany was too far behind the rest of Europe in culture and civilization for universities to develop spontaneously, and when the time of artificial foundations had arrived its political dissensions did not favor such an experiment. Hence, for two centuries the university movement affected Germany by drawing away its students to foreign institutions. Migration also was rendered necessary by the fact that the early universities were highly specialized and, last but not least, it was greatly encouraged by the reputation of individual teachers who attracted students in quest of particular knowledge from near and far. German students

thus abounded both in France and in Italy. It has been estimated that from 1289 to 1350 the average annual membership of the German nation at Bologna alone amounted to 250 students. The earlier German students at foreign universities were for the most part young men of noble birth and well born or well beneficed ecclesiastics, which probably accounts in part for the exceptional privileges they enjoyed at Bologna and elsewhere. Later came the less well-to-do, and last the poorer classes in such numbers as to exceed their representation in modern university life. Poverty was no disgrace, begging no dishonor, in an age in which charity was regarded as the highest duty of the Church. The establishment by the higher clergy of colleges and burses for poor students supports this point of view.

The earlier motive for the attendance of foreign universities was, as a rule, supplied by the aspiration to one of the higher clerical offices, and the causes which were drawing German students to Italy later on are, of course, not hard to find. The new spirit of the renaissance, by passing over the middle ages and going back directly to antiquity, was revolutionizing the intellectual world. Italy became imbued with it long before the rest of Europe had awakened to its influence. Italian scholars were the first to see the ancient world in its true light, being enabled to do so through a study of its classics from a literary point of view rather than in an endeavor of finding allegorical explanations of Christianity. The Italian universities, moreover, were then eminent above all others. Philosophy, natural science, medicine, civil law and Greek, elsewhere almost unknown, flourished at Padua and Bologna. Then again, travel, as pointed out above, was to the man of learning a kind of inner necessity. He was actuated by ideal rather than material considerations. To-day the transfer of activities to foreign countries, even by physicians and the Catholic clergy, is an exceptional proceeding, for a thousand ties bind the man of education to his country and his people. During the period in question it was a common thing. To the country of his birth and its people the man of learning was essentially indifferent. He clung to the Church or his science, or both. For this Church and science were the same everywhere. And wherever he went he found Latin, the universal language of the learned. Numerous biographies of men of renown of that age furnish us with an abundance of data concerning the unsettled mode of life of the learned of that period. One concrete example will serve to more firmly establish the fact: A man whose life, better perhaps than any other, gives us a vivid picture of the custom of his time,—a wandering scholar in the best sense of the term. If he

happens to be a German, that is due to the fact that among all the nations the German scholar was the traveller par excellence. And if his name is Rudolf Agricola, it is because the well known fruits of his life of travel best demonstrate the import for their age of this type of wandering scholars.

But not all the learned of the age of humanism were of his class. Entirely distinct from the more earnest, dignified, scientifically solid humanistic type as represented by such men as Agricola, Reuchlin, Erasmus, and others, were the so-called poets or orators. In forming an idea of such a poet one must not be confounded by what the term implies in common parlance of to-day. He is to be pictured rather as a man, well acquainted with the works of the ancient authors, who knows how to comment upon them and to recite and write, in poetry and prose, after their style. Rendering material in verse, as is well known, was an essential part of the Scholastic curriculum. This was continued practically by the poets with the difference that a purer language supplanted the Barbarian Latin of Scholasticism. They may thus be said to represent a unique phenomenon in the German world of learning and one which since then has never re-appeared. The youths of the *Sturm* and *Drang* period, the romanticists and the nationalists, who in other respects somewhat resemble them, lack the didactic element which goes here hand in hand with the poetical.

Poets, though usually of the laity, nearly always adopted celibacy for the simple reason that the ties of marriage, like everything else that in any way resembled constraint, were distasteful to them. Their special mark was their extreme restlessness.

"Ex diverso multi convenimus,
Quo logices fons erat plurimus;
Sed discedat summus et minimus,
Nam negatur quod hic quaesivimus.
Tort a vers nos li mestre."

"Aus allen Ländern kamen wir an,
Wo die Quelle der Logik am stärksten rann;
Jetzt scheide von hinnen jedermann,
Weil keiner sein Ziel mehr erreichen kann.
Denn Unrecht that uns der Meister."

Thus they sang. And from place to place, from school to school, from university to university they wandered. One reason for their unsettled life, perhaps the principal one, was their poverty. A genuine poet, we are told, a Conrad Celtis, Hermann Buschius, Ullrich von Hutten, or Helius Eoban Hessus, was always hopelessly in debt and obliged to appeal, time and again, to the liberality of his more fortunately situ-

ated humanistic friends, in an effort to escape serious difficulties. The logical consequences of this state of affairs were the development of a certain lack of principle and a somewhat low moral standard generally. Though resorting, from a sense of delicacy, to the make-shift of cloaking their appeal for a loan in the poetical garb of Latin verse, some of them, it would appear, were not above selling for filthy lucre the products of their Muse. It is told, for instance, of Buschius that he did not think it improper to deliver to the clergy of the diocese of Cologne an oration in which he exalted the superiority of Scholastic theology and its representatives,—to write an epigram for a disputation by one Arnold von Tungern (most cordially hated by all humanists), in which he characterizes Reuchlin as champion of the Jews and violently attacks the university professors of Cologne, whom he accuses of loving money better than the Muses,—only later to, what was to be expected, play himself off as one of the most enthusiastic followers of Reuchlin and the enemy of all Obscurants.

On the other hand, there are on record also ludicrous instances of their poetic pride as, for example, the case of Conrad Celtis who, having written, in the obvious hope for a tangible reward, a panegyric on the city of Nuremberg, was awarded by the council of that rich city the munificent sum of eight gulden, only to return them as being below his dignity to accept. When, after revising his work, he is later offered twenty gulden, he retains the money but even then does not think it necessary to write a letter of thanks.

Not to elaborate further, the essential characteristics of the poet are ever the same. On the moral side of his make-up, a libertinistic incoherence of life which hides nothing and makes no apologies and, on the mental side, the exaltation of the new culture combined with a thorough contempt for the antiquated sciences and their representatives, from his point of view, both the marks of a freer spirit,—that, in a nutshell, is the wandering poet.

Leaving the poets we encounter a class of wandering scholars who moved in much lower strata of society. The traditions of this type were formed during the twelfth and thirteenth centuries when the wandering clergy, the *clerici vagantes,* became identified with them. The chief cause of their coming into existence was probably the privilege of safe conduct granted to travelling university students which was peculiarly liable to abuse by the idle and vicious. The latter in time became dreaded fixtures of the life of the country (as students in university towns sometimes do now) and came in for severe criticism on account of their free habits of life

and their liberal views. The contemporary monk Helinaud writes of them as follows: "The scholars are accustomed to wander throughout the world and visit all the cities; and their many studies bring them understanding; for in Paris they seek a knowledge of the liberal arts, of the ancient writers at Orleans, of medicine at Salernum, of the black art at Toledo, and in no place decent manners." The last criticism was undoubtedly well deserved for it was this trait which by some writers is believed to have later given them their class name and stamped them as a well defined body, a sort of corporation. Its membership was drawn for the most part from the younger clergy and those in the minor orders who, while claiming all the privileges of the clergy, were willing to accept few of their responsibilities.

The common meeting place of all was the new institution of learning, the university. Here the students in permanent residence incorporated as the Nations, the constituent units of the earlier universities. A smaller number, who preferred the wandering habit as a permanent mode of life, strengthened their fraternal bond by swearing allegiance to a titular Magister, one Golias, by some believed to have been a nickname of the famous Abélard, more probably, however, a hypothetical personage, but the rule of whose customs was certainly something more than a mere shadow. And so also was the brotherhood. The typical goliards * were the more riotous, unthrifty and unambitious,—men of some little university education, of depraved tastes, who were hangers-on of the higher clergy, wandered from one palace of an ecclesiastical lord to the next one, or made use of their character of traveling students for the purpose of deriving alms from the charitably inclined, more especially the parish priests whom occasionally they aided in teaching and in other duties. A second class, because of their more permanent abode, were called *locati*. The line of demarcation between the two, however, was not very distinct since their pleasures and their vices, their songs and their literature, were those common to all wandering scholars of that time. Through their attempts at poetry chiefly, but also by accounts of a few contemporary writers, we are enabled to catch glimpses of their habits and their general mode of life. Most of their songs were frank protestations of the pleasures of drinking, gaming, and love in many phases, whose order of desirableness seems to have been such that advice to refrain from "wine, woman and song" might possibly have been followed to the extent of dispensing with the singing.

* It has also been suggested that the term is derived from *gula*, and indicates their gluttonous and intemperate habits.

In the second half of the thirteenth century they had become so intolerable a nuisance that decided opposition to them grew up among the clergy. Many of the bishops and abbots ordered them to be met with cudgels instead of alms. Toward the end of the century the Church authorities prohibited the parish priests from aiding them in any way and pronounced heavy penalties in case of disobedience. Being thus cast off by the clergy and at the same time separated from the laity by the immunities of their clerical character, their status sank rapidly and below even that of the minstrels of the secular nobility.

Though checked for a time by vigorous measures, the vagabond scholars, nevertheless, were by no means suppressed. They reappeared in the following centuries chiefly, perhaps exclusively, in Germany, in large numbers and in various forms, being known then as *vagantes* from their roving mode of life or more frequently as *bacchantes,* meaning followers of Bacchus, the God of wine, and applied to them because of the vicious conviviality of their habits.

In the earlier ones of these *scholastici vagantes* we have to do with a not essentially new type of wandering scholars. Their habits and customs closely resembled those of the goliards. This is indicated by the poems which have come to us from two of these *vagantes,* Johannes von Nürnberg and one Nikolaus who calls himself "Archipoeta." They appear to have been a queer mixture of character, jolly, eccentric, extravagant, dissipated, shabby and beggarly, on the one hand, and then again arrogant and proud. Their chief aim of existence is a life free from care. Wherever there is something to be had for nothing the vagant is sure to be on hand. He revels in plenty to-day and starves to-morrow. His greatest enemy is the winter-time, but even then he knows how to help himself. Were he unsuccessful during the day in obtaining food and tired from wandering about, he falls back on his last resort. He approaches some pious man, sings to him his songs and begs until kept over night. Nor does he despise to endear himself to the waitress at the inn when there is a prospect of obtaining food and drink or possibly a resting place behind the stove. But with the advent of spring, bird of passage that he is, the town knows him no more and he escapes into the sheltering wings of the green forest.

For a living he has recourse to all kind of subterfuge from work. He appears as healing artist, astrologist, interpreter of signs and dreams, treasure-locator, actor, juggler, miracle-worker, in short as king of confidence men. Sometimes he impersonates a musician and singer, in which case he is known as "lyrant" after the instrument that he carries. As a rule,

however, he is up to some trick entirely out of the ordinary. He calls himself master of the seven free arts, pretends to come straight from the Venus mountain and to be endowed with peculiar powers. An old pamphlet by an unknown writer, printed about 1510, entitled "*Liber Vagatorum*," refers to this class as follows: "They are beggars or adventurers, dressed in the gray coat, coming from Frau Venus mountain, knowing the black art and being called wandering scholars. The same, when they enter a house, then they begin to speak 'here comes a wandering scholar, of the seven free arts a master, a conjurer of devils, against hail and weather and all kinds of misfortune;' after that he will murmur a few mystic words, cross himself two or three times and say 'wherever these words are spoken nobody will be stabbed to death nor will any accidents happen to them here or in any part of the land,' and many more such artful words. And in time folks begin to believe that it is so and are glad that he came and, having never before seen a wandering scholar, they will say 'such and such a thing happened to me; if you can help me I would gladly give you a gulden or two.' Then he will say 'yes' and begin the experiment. And there is nothing one can ask on which he is unable to experiment, that is to say, to fool you and cheat you of your money. Conclusio: Of these *vagantes* beware! For the tales which they tell are nothing but a mess of lies."

Of so-called wandering necromancers, who posed as healers, Johannes Pauli writes as follows: "Time ago wandering scholars went around the land who deserved a knitted cord around their neck; they were great deceivers. Of these one came into a house in which was a woman whose eyes pained her. He spoke to the same woman 'should she give him a gulden, then he would hang a letter on her neck so that none of her eyes would ache any more as long as she carried it; nor should she show it to anybody.' The woman was glad and gave him the gulden; the scholar gave her the letter, sewed in, and hung it on her neck. The woman carried it some years, perhaps three or four. But once, when she went to confession, the priest asked her if she had no superstition. She answered that she had been given a letter; how she carried many sacred names on her neck, for painful eyes. And the priest would not absolve her unless she allowed him to read the letter. When he read, then he laughed. And when the woman asked why he laughed, he read aloud so that she could understand. And there it stood: 'May the hangman put out your eyes and the devil spit into the sockets!' The woman did not want to believe that such was written in the letter and took it and carried it to three or four other persons.

Then, of course, she had to believe it. Angrily she tore up the letter,—and then her eyes began to pain her again."

A writer named Bernhard Ochini tells of a kind of wandering scholars, called "*ceretans,*" whose specialty was to take advantage of people's credulity in religious matters. "A *ceretan* or wandering scholar travels about," he writes, "who proclaims to know a prayer of St. Gregorio which has so much virtue that, as often as he speaks it, a soul is redeemed from hell;—but first he must be given a gulden." Or again, "there was a *ceretan* or wandering scholar who came into a town and announced that he had power to save souls from purgatory, and who received much patronage from those anxious to redeem them."

Nearly all writers on the subject of wandering scholars mention the Venus mountain and the mastership of the seven free arts. One believed in that credulous age, it would seem, that in this mountain feast followed feast, tournaments alternated with grand balls, hunting parties with banquets and with all possible kinds of amusements; that it was a place where one rode, raced and revelled, danced and caroused, lived, lazed, and loved. Of several mountains which were thought to have been consecrated to the goddess Venus the so-called Hörselberg near Eisenach is best known, being linked with the name of the noble Ritter Tannhäuser. In one of these Venus mountains the wandering scholars claimed to have been and they knew how to picture everything therein at great detail and in glowing colors.

The mastership of the seven liberal arts, according to popular belief, could only be obtained in a so-called devil's school. In these schools the devil was said to sit at his desk in human form and to discourse on various sciences such as physics, mathematics, mechanics, theology, jurisprudence, medicine, astrology and magic. The hearers were not permitted to write down anything during the lecture nor were they allowed to ask questions of their black professor. One among many of these high-schools of the evil one was believed to have been located in the city of Salamanca in Spain, in the Street of St. Pollo. In a corner house of that street is a large cave in which magnificent palaces with superb rooms and gardens are to be seen. In these, once upon a time, the devil was supposed to have kept school. Seventy students were admitted to his course in the black art but on the condition that the last one to go out should be his. Similar places were believed to exist in France, Finland, and elsewhere.

In the course of time the *scholastici vagantes* were wholly absorbed by a type of wandering scholars already mentioned, the *bacchantes,* which now became prominent, "masters with

their bands of boys," through histories of education best known of all. The elementary teachers at that time were, as they have too often been in later days, largely recruited from the failures in other callings. Many were engaged only for brief periods of time, were miserably but probably adequately paid for their inefficient services and, when dismissed, wandered from place to place in search of employment. They were a poor, despised and too often immoral class. In addition there were lusty young fellows with coarsely roistering manners who occasionally did some teaching in the schools of cities that offered an ample if modest means of subsistence. Certain cities, because of special advantages, seem to have been particularly honored by their presence. Breslau alone is said to have harbored several thousand at the beginning of the sixteenth century. In Ulm they were so numerous at that time that the city was nicknamed " Grandis Bacchantria." Documents of the city of Frankfort, on the other hand, mention the presence of *bacchantes* but once, and that in the year 1480.

The *bacchantes* perfected begging to a fine art. The city of Breslau was divided by them into sections and one of these assigned exclusively to scholars who had attached themselves to certain schools. In this section they enjoyed a monopoly. In Nuremberg a similar division was made but, in addition, the pupils of each school were divided into groups of ten, each group taking its turn to do the daily begging. Two members of each group carried large baskets of a capacity of perhaps two or three bushels, each one of which was adorned with a picture of the patron saint of their school. When filled, they were carried back to the school and there the spoils were distributed. (Cuts of these begging students with their baskets are still preserved.) The custom of taking entire schools upon singing tours throughout the city, as a rule on evenings before a holiday, afforded another profitable source of income. In some cities in which large numbers of these scholars were in constant residence, in Nuremberg for instance, the city council attempted to control their customs by ordinances.

Bacchantes permanently connected with a school were called *locati.* This presumably was the stage striven for and reached only by the older ones who had shown ability to teach in the municipal and guild schools. To most of them, however, the pleasures and the easy life of wandering proved a greater attraction than did the honors and responsibilities of a fixed position in a school. They preferred teaching in private families for brief periods or sometimes took charge of young boys not yet in their teens, ostensibly to teach them, while wandering, the rudiments of knowledge, in reality, however,

for the purpose of having the boys provide them with food from day to day.

These boys form an additional class of wandering scholars, quite distinct and quite numerous, called A. B. C. *Schützen* or shooters. The term refers to the elementary nature of their studies and to their method of gaining a livelihood. The latter consisted of indulging in the half-authorized or at least tolerated custom of securing by theft domestic fowl which they managed to capture by throwing stones. It has been suggested that there is probably some connection between this sixteenth century custom and our expression "teaching the young idea how to shoot." Of the life led by these fags, traveling about, begging and stealing for their brutal *bacchantes,* we have a good account in the auto-biography of Thomas Platter, a shooter who later gained distinction. Tired out by long marches, beaten by the master for failure to bring in sufficient food or by the farmers when caught stealing, starved sometimes to a point where the gnawings of hunger would induce them to snatch a bone out of a dog's mouth, getting the worst of it at every turn, the life of a fag was certainly not an enviable one.

The progressive changes in the school system wrought by the influences of the reformation put an end to the wandering scholars, at least of this type. Owing to the great diversity on the part of the older institutions in their attitude toward the new learning many students continued to follow a wandering life. The term *bacchant,* however, was soon restricted to students about to enter upon a university course, the "*beani*" or foxes, around whom centers much that was objectionable in the university life of that time. Their so-called "deposition," a forerunner of the modern custom of the badgering or hazing of freshmen, assumed finally such extreme forms as to require intervention by national legislation in order to bring the students under control. But by that time the wandering scholar in the medieval sense had almost ceased to exist and the term was applied to a heterogeneous type.

His spirit, nevertheless, has never quite disappeared and is still latent, particularly in Germany, as we know. Even in our own case it happens that we listen to a lecture at Clark in the morning and in the afternoon attend a clinic in some other town. Indeed, in view of the proximity of some of our universities, Columbia and Yale, Harvard and Clark, not to mention many other pairs, it would, by the aid of electricity or steam, be quite feasible to attend lectures in one institution in the morning and in the other by noon. One boards a car or train and travels on,—wandering scholars of the most modern type.

Bibliography

1. Barnard, Henry. German Educational Reformers. Brown and Gross, Hartford, 1878. 724 p.
2. Bärnstein, A. P. von. Beiträge zur Geschichte und Literatur des Deutschen Studententumes. A. Stuber, Würzburg, 1882. 156 p.
3. Dolch, Oskar. Geschichte des Deutschen Studententums. F. A. Brockhaus, Leipzig, 1858. 300 p.
4. Lagrange, E. Les écoles au moyen âge. Lebègue et Cie, Bruxelles. 109 p.
5. Lorenz, S. Volkserziehung und Volksunterricht im späteren Mittelalter. Ferdinand Schöningh, Paderborn und Münster, 1887. 132 p.
6. Mertz, Georg. Das Schulwesen der deutschen Reformation im 16. Jahrhundert. Carl Winter, Heidelberg, 1892. 681 p.
7. Monroe, Paul. Thomas Platter and the Educational Renaissance of the Sixteenth Century. D. Appleton and Co., New York, 1904. 227 p.
8. Paulding, J. Kirke. A Wandering Scholar of the Sixteenth Century. *Atlantic Monthly,* Oct., 1890, vol. 66, no. 396, pp. 480-491.
9. Paulsen, Friedrich. Geschichte des Gelehrten Unterrichts. Veit und Co., Leipzig, 1885. 811 p.
10. Rait, R. S. Life in the Medieval University. University Press, Cambridge, 1912. 164 p.
11. Rashdall, Hastings. The Universities of Europe in the Middle Ages. Clarendon Press, Oxford, 1895, vol. 2. 315 p.
12. Reicke, Emil. Der Gelehrte in der deutschen Vergangenheit. Eugen Diederichs, Leipzig, 1900. 143 p.
13. —— ——. Lehrer und Unterrichtswesen in der deutschen Vergangenheit. Eugen Diederichs, Leipzig, 1901. 135 p.
14. Schmid, K. A. Geschichte der Erziehung. J. G. Cotta, Stuttgart, 1892, vol. 2, part 1. 611 p.
15. Schulze, Friederich and Ssymank, Paul. Das deutsche Studententum von den ältesten Zeiten bis zur Gegenwart. R. Voigtländer, Leipzig, 1910. 487 pp.
16. Williams, Samuel G. History of Mediaeval Education. C. W. Bardeen, Syracuse, N. Y., 1903. 195 p.

THE TEACHING OF CURRENT EVENTS

By Charles E. McCorkle, Clark University

Little has been written upon the efficient teaching of current events. It is a field of recent development and as yet is somewhat in the experimental stage.

In the majority of cities where current events are taught, the teaching is very inefficient and of little practical value. This fact was conclusively shown when the answers to the questionnaires on "How to Teach the War" * were classified in regard to one of the questions, *i. e.*, "How are Current Events Taught in Your Schools?"

Out of one hundred and nine cities only seventy-eight were found to be teaching current events. From these seventy-eight cities, a choice of twenty-one was made because of the tone of more efficient teaching in this work. Full information was requested and replies were received, some stating in full and some in part just how and in what grades current events are taught.

The following reports are representative of the most efficient work along this line:

Office of City Superintendent, New York City.

"—— principals and teachers have their own method of doing this work. Programs of two schools will give you a clear idea of what is being done.

In a Boys' School

The Direct Method

1. Compositions.
2. Discussions and debate in class and assembly.
3. Reading, newspapers, magazines, clippings, etc., in class and assembly.
4. Visiting parks, museums, exhibits, etc., to see things of current interest.
5. Pupils are given credit for keeping scrap books of news items, pictures, etc., on topics of current interest.
6. Classes have bulletin boards for current events.
7. Some important event is put on the board each day.
8. Some classes subscribe to a paper called "Current Events."

The Indirect Method

As far as possible such subjects as lend themselves thereto, as, history, geography, dictation, arithmetic, drawing, science, etc., are correlated with important current events.

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* See *Ped. Sem.*, March, 1915, p. 1.

IN A GIRLS' SCHOOL

Time

About a half hour weekly, in connection with history, geography, or oral composition.

Grades

Beginning formally at 4A.

Sources

Daily newspapers, the small paper, "Current Events," "World's Work," "Literary Digest," magazine sections of some of the Sunday papers, magazine articles.

Methods

Conversation: Free discussion between teacher and pupil. Reading to class by pupil or teacher followed by discussion. "Current Events" read at home; later discussed in class. Map study of localities mentioned in events under discussion.

Bulletin boards kept on which clippings and pictures of current interest are posted and taken up later for class discussion.

Discussion of items of neighborhood interest introduced by pupils, i. e., local celebrations, public works affecting the immediate vicinity, elections, etc.

Moral issues involved in questions under debate brought out and discussed.

Occasional talks from the platform at morning asemblies, sometimes used as subjects for compositions.

To maintain interest and insure that the work shall be followed up:

1. The children are given credits for research-reading up and bringing into class topics for discussion.

2. Teachers are required to note in progress books points of current interest taken up during the month."

District Superintendent Gertrude E. English, Chicago, Ill.:

"It was my good fortune to act as chairman of the Survey Committee on History and Civics. In going about from school to school, I found many instances of the teaching of current events in an admirable manner. From my recollection of the matter, I have selected eight representative people. I am asking each to write you in regard to his or her method of presenting the subject of current events. . . . In a situation so cosmopolitan and varied as that of Chicago presents, the treatment differs widely in the different localities. I have endeavored to give you representative people from widely differing districts."

Mary B. Livingston, 8th Grade, Farren School, Chicago, Ill.:

"Previous to this year, I have planned the teaching of Current Events in a different way from that which I have planned this year. Last year the children had a little paper called "The World's Chronicle" in which I assigned topics or the children asked about certain topics in this paper, these we took in class for discussion.

"This year we are 'trying out' a new course of study. I decided to teach Current Events without any prescribed paper. I did this with fear and trembling but I have found the interest even greater than formerly. Part of this can, undoubtedly, be explained because of the exciting nature of the European news.

"At the beginning of each history period any child who has a picture or a cartoon shows it to the class and explains it. If I consider these very good, they are pinned in the bulletin board. Often the child may wish to ask about his picture or his cartoon, etc. I have the children bring clippings from the newspapers which he reads

or tells about. I prefer the child's own presentation but ask him to bring the original article because he often makes mistakes in his interpretation.

"I try to work Current Events back into history and vice versa. For instance, the child who told about the discussion in Congress over the War Tax, was not sure how the tax bill was to become a law, so we turned to the constitution.

"In studying the Mexican War, the recent events in Mexico were brought up and compared with those that happened during the war and previous to it.

"In September, the children brought all kinds of news items to class but they show greater judgment in their selections. They certainly are interested in the topics of the time and are learning to handle the newspapers better than I had hoped at first."

Florence I. Wood, Head Asst., Sheilds School, Chicago, Ill.:

"My pupils are nearly all of foreign parentage and from homes in which they hear little or no discussion of Current Events, thus making it necessary for the school to do something for them along this line.

"I have no set period for the work, but make it a part of the History or Geography lesson; occasionally, some topic of special interest is discussed during opening exercises.

"I usually keep several topics on the board; local, state, national, world-wide. I try to interest the class in whatever is occupying the attention of thinking people.

"Items which the pupils find in papers or magazines which they think bear on our topics, they bring in. Of course, many of these articles are useless, but I try to lead them to discriminate between important and unimportant news items. Nearly all in my room subscribe for a little paper called 'The World's Chronicle' which they read with pleasure and profit, and in the matter of discrimination as before mentioned. I find this paper most helpful. To begin with, the 'news' in it is extremely well selected, and then I usually ask my pupils to report the three articles which they think are most important and they are expected to tell why they think so.

"When Congress is in session, we follow important legislation. Registration Day, General Election Day, Fire Day and numerous other 'Days' furnish topics. The Panama Canal is a 'continued' story from week to week, and since the European War, the Kiel Canal has taken on new interest.

"I make a point of talking about proposed local improvements as for instance, the New Station about to be built. The fact that it would give employment to a large number of men appealed to some.

"Our geography is from a commercial point of view, and without dwelling on the 'horrors of war,' we have been able to arouse much interest in sources of supply cut off by the war, and the efforts of manufacturers to find new sources. 'What to do with our Cotton?' 'Why have we no merchant marine?' 'Contraband Goods' and other questions of the present movement are being considered.

"I encourage pupils to bring clippings that especially interest them and then we talk about them. If it is some cartoon, some map, some heading of particular interest, it finds its way to a bit of space on the walls of my room that I call my bulletin board. Sometimes I have the pupils put them in their note-books. That is about all the Current Event work I do during the First Semester. I am simply breaking ground for the next term.

"During the Second Semester I do my most independent work. Once a week we have Forum Day. This is our clearing house. All

manners of modern problems are discussed. I teach my pupils to have respect for one another and each one is entitled to a hearing. Broadness of mind and careful judgment are inculcated. Debates are held, reports are given that require some amount of research work. Just yesterday one of my lads told me that he is going through every branch of our Health Department, preparatory to giving a report on its work. Another boy gave a most interesting talk and answered questions on 'Merchant Marine.' We have followed with bated breath the work of the 63rd Congress, we have an eye on the men who represent us. How excited we were last Tuesday, election day! My pupils feel that they are missionaries for stirring up civic interest in their own homes and in their community.

"Last year we made three charts that are original—one a study of all the courts found in Chicago, and we are well 'courted' here, another an election chart, and third, a diagram of the Rise and Fall of Political Parties. The pupils enjoyed this work very much.

"Last of all I am like Mr. Squeers in Nicholas Nickleby, who told the boy who had spelled the word 'window' to go wash it. I take my classes on trips. We visit the City Council, we go to the courts. Federal Judge Landis is such a great help to me and is very much interested in what I am doing. We see 'Chicago first.' We attend political meetings, we meet candidates, in short we have our finger on the pulse of modern life."

Annie McClements, Burr School, Chicago, Ill.:

". . . To me, history is living politics, and great events of the past are valuable only as they concern the present and influence the future.

"When Congress was revising the tariff downwards, we followed the tariff from the days of Washington down through the administrations of John Q. Adams, Jackson, and McKinley to the present time.

"The establishment of the Federal Reserve Banks and the fight in Congress to do away with our old rigid limitations on the extension of credit, were studied in connection with Hamilton's Financial Policy, Jackson's war on the United States Bank, Panics and so forth.

"The battle for suffrage for women, Child Labor Laws, State Regulation of the rate per mile charged by railroads, were brought under the States Rights problem.

"Germany's reported preparation to invade Canada because that country had furnished troops to England, and England's threat to hold the United States responsible for the furnishing of supplies to Germany's war vessels by the countries of South America, were discussed in connection with the Monroe Doctrine.

"The terrible foot and mouth disease that came home with such force to Chicago, was used to show the duties of the departments of the Cabinet.

"We are always on the watch to keep in touch with the world around us. It is wonderful how many items are found in the papers by the live pupils—that are just in line with the things we are studying. I have them get the news direct from the papers because I prefer my information uncensored and unexpurgated."

Asst. Superintendent A. H. Hill, Richmond, Va.:

"In our high schools we devote one-half hour each week to the subject in each of our classes using selections from the daily papers and special Current Events papers. The various topics brought up are discussed and relative values brought out as far as possible.

We have several periods devoted to illustrated talks by the use of the balopticon and the post cards. The one I have in mind was delivered in German by a teacher who spent the previous summer in Europe. In the elementary schools we proceed as above, and in addition we are securing the Pathé films for use in our moving picture machines. In any recitation the matter is again brought directly home to the pupil by references to current topics. In the night schools we have an optional class, largely attended, that is held once a week at 9.30 P. M.—the close of the regular session."

Superintendent John R. Wilson, Paterson, N. J.

"All grammar schools subscribe to the weekly magazine 'Current Events.' One copy is provided for every two pupils in the grades in which it is used. One set sometimes answers for several grades. A definite time is given this work on the classroom program. The paper is read and discussed by the pupils as a class exercise in much the same manner as the geography lesson is conducted. The teacher decides the order in which the items shall be read and makes whatever application can be made to the other studies of the pupils. These magazines are supplied by the Board of Education without expense to the pupils. The expense is charged against the account for books and stationery."

Superintendent J. H. Phillips, Birmingham, Ala.:

"The teaching of Current Events in the Birmingham Public Schools is as follows.

"In most of the grades, definite periods each week are devoted to the teaching of current events. As a rule, this forms part of the 'Opening Exercise' period.

"A number of the schools subscribe regularly to the 'Scientific American,' 'Literary Digest,' 'Collier's Weekly,' 'National Geographic Magazine,' 'Leslie's Weekly,' and 'The Youth's Companion.' In addition, the daily papers are regularly used.

"The aim seems to be to inform the pupils regarding the events of current interest, and at the same time to teach them to discriminate between what is really worth while and what is purely sensational or positively bad.

"I quote the following regarding the method of teaching current events from the statements given to me by principals and teachers:

"'Children bring clippings from newspapers which they read aloud during opening exercises. These are often discussed by class.'

"'The Class subscribes to "Current Events" which they read regularly,—sometimes using it as a reading lesson.'

"'A written paragraph on "The Most Interesting Article in the Daily Paper" brought excellent results one day this week.'

"'In the upper grades, children are encouraged to give complete reports rather than separate or disconnected facts.'

"'The natural interest and information of a number of newsboys in our class is made use of.'

"'The European War very naturally has been the principle topic, especially in connection with the work in history and geography. Many of the rooms have large maps on the wall.'

"'Our Seventh Grades are organized into literary societies and meet once every two weeks. Debates on current topics, as well as a study of current events, constitute an important part of each program. These have proven very helpful.'

"'There is a general agreement among the teachers and pupils that no events that result in murder are suitable for discussion.'

"'In one room, the children have collected pictures of the leading characters participating in the European War, together with data bearing on the operations from day to day. These are all arranged in a school scrap-book.'

"'In another class, the period was given over to a discussion of the spread of the cattle disease so widely discussed in the recent newspapers. A few days previous, the teacher had told the pupils where they could find information regarding the different kinds of cattle,—those raised for milk and butter. Pupils had also informed themselves as to the states that lead along these lines.'

"'Current events are correlated with reading and composition in our Seventh Grade. One reading lesson each week is given over to newspaper items which the children select, read aloud, and criticise. Once a week, the open period is given to written composition based on current events. Children write on the board one paragraph, sometimes this is a reproduction lesson, sometimes a headline is furnished from which the paragraph is developed. In addition to this, there is usually one oral lesson per week. In this, much geography and history are taught. On the teacher's desk are to be found occasional copies of Leslie's, Collier's, and the World's Work; always the Independent is there. These magazines are eagerly read by pupils, if the teacher is not unduly diligent in requiring full resume of articles read. The three topics most frequently stressed are the Great War, the recent legislation, and national politics.'"

Superintendent A. N. Cody, Flint, Mich.:

". . . teachers especially, in the upper grades devote one recitation each week to this subject and incidentally many topics are discussed at other times during the recitation of this subject of current events. Pupils feel free to bring any material found in their general reading from various sources and the question of Geography and History plays an important part in these discussions. Then again, we use in grades seven and eight a text entitled 'The Community and the Citizen,' published by D. C. Heath & Co., which is very suggestive for discussions, and now since the terrible war is on, we draw many conclusions and direct the discussion toward peace movement, and comparisons are made with reference to the cost of war as compared with the maintenance of educational institutions, to say nothing of the terrible loss of life. It is difficult to give you a real picture of what we are doing but I know that we are accomplishing much in the subject of current events."

Superintendent H. B. Wilson, Topeka, Kansas:

"In a number of schools, in the upper grades the teachers and children have been keeping an up-to-date war map. The data for this map they have secured from the daily press and from the Little Chronicle, which is supplied by the Board of Education for the use of all grades above the fourth in all schools. These Little Chronicles are supplied in quantities of about twenty-four each weekly. This number is used by passing them around from grade to grade. They are kept in permanent files for reference. In some schools I found a reading table has been provided where other approved things than the newspaper and the Little Chronicle may be preserved. Considerable use I found has been made of the issue of the World's Work. In the upper grades of all the schools I found that the interest and enthusiasm over the war had been made the basis for a study of the strong and weak points commercially of the nations at war. I did not find in any school that notebook work which is permanently preserved was being done."

Superintendent A. F. Ames, Riverside, Ill.:

"We devote one or two periods each week to Current Events in the primary grades, in charge of one teacher. Certain subjects are selected by the teacher and treated in a general way, for instance: the subject two or three weeks ago was 'The Christmas Ship,' to which our School contributed, and this brought in the question of railway transportation. During the present week the subject has been 'Elections,' and the children have been asked to find out at home what is going on, what questions are being voted upon, and their attention has been called to the new element of women voting. This is the first year we have done this systematically in the primary grades, and the children are taking a great deal of interest in reporting and discussing the news. The teacher feels that it has increased their interest in reading, and emphasizes the fact that one purpose of reading is to gain information. They often bring clippings, some of which are well worth while.

"In grades 5, 6, 7, and 8 pupils have in their hands 'Current Events' to which they devote one ¾ period each week. In addition to the interest in the subject itself, a motive for the work is found in the fact that newspaper reading is a task awaiting the pupils as they grow older, and their initiative and training in judgment are developed in selecting the articles most worth while reading. In this they are required to defend their position."

The outlines and methods of teaching current events in the cities just given are most commendable and worthy of careful consideration. As was previously said, these reports are the best received and have been selected because a combination of the best features of each into one outline and method of instruction, adapted to the needs of the particular city in which it is used, will be of great value to the progressive teacher. Because of the varying conditions in different cities, it would be folly to make an outline and to designate a method of teaching this important work. Sufficient outlines and methods have already been stated in the quoted reports. The desire is to make more emphatic the value and importance of this work that has already been given, and to stress as much as possible the need of devoting more time to current events and to practical vitalized methods of teaching that have a new educational evaluation of the subjects taught.

A definite iron-clad method of doing things, a departure from which is unpardonable and which makes mere machines of the teachers and children, is most abominable and should not be tolerated by the citizens of any city. Yet there should be an efficient system of doing things which is pliable and adaptable each hour of the day, if necessary, to any change or need that may arise in order to meet the definite goal of any school or school system. There is a desire here to condemn the extreme "clockwork and machine system" that too many superintendents, supervisors, and principals are compelling their teachers and children to undergo. In some places this is so severe that one can almost hear the wheels begin to

grind with the ringing of the school bell for the hour to begin, and this lasts till the children are sent to their homes. This method of teaching without the individuality, originality, interest, enthusiasm and the many other features that go to make up the live teacher, is certainly a great pedagogic crime, not only against the teacher but the children as well, for a loss of time and opportunity to children should certainly be recognized as such.

The other extreme that should be more harshly condemned than the severe machine method is the lack of system. To conduct a school without any plan, method, aim or goal is most pitiable, for by this procedure there is a lack of proper mental and physical discipline. Merely doing is not enough.

The system that is to be encouraged is the one that finds the "golden mean" between the above two extremes. The aim, goal and result are the important features in this system. The clock work is not a necessary feature. Of course every teacher should have a daily program and should outline her work in advance for each lesson every day, but there are times when deviations are necessary, because there are "psychological moments" in school-life when five minutes more time in a recitation will mean more than one hour the next day.

There are many good features in the reports of current events teaching from all the cities given. New York has an excellent outline for instruction which seems to be all-inclusive. Also, there seems to be attached to this work a very estimable evaluation. However, it would be very desirable to know the amount of time that is devoted to this work, the originality, individuality and enthusiastic interest that the teachers and pupils show, and whether the aim, goal and results are sufficiently impressed upon the children.

The summary of the reports of the Chicago Schools indicate the enthusiasm and the interest of the teachers, the importance attached to current events teaching and the results the teachers are accomplishing. Little machine work is found, but great responsibility rests upon the individuality, interest and results of the teachers. There is a tendency to break away from the "old methods" and an endeavor to meet the practical needs of real citizenship, not only in understanding the present by touching the problems and interests of the pupils in their homes, districts, state, and nation, but also by viewing them in the light of past history and progress. A new educational evaluation of subjects is taking place. This is a most encouraging situation even though it is more of a mental attitude than a real situation, for if so much importance is attributed to this teaching and its practical value is so great, why is there so little time devoted to it in comparison with other

subjects, some of which, nearly all educators maintain, are not important?

The current events work that is now being done should not be spoken of lightly, and it is not in the spirit of destructive criticism that the above is written. From these reports it is possible for supervisors and teachers who have regarded this work as of little consequence, to formulate outlines and methods, and to establish aims and goals that will be commensurate with the value and far-reaching results of this, one of the greatest subjects that can be taught not only in the elementary and secondary schools, but colleges and universities as well.

As an illustration of practical criticism, let us consider briefly the current events course in Nashville, Tennessee. Here ten minutes (usually more time) are devoted to current events,—four thousand words from grade 3 B through 8 A with not only the spelling but meaning and use, are learned. The results to be derived from this teaching are,—

"(1) To train the pupil so that in after life he shall be able to know important events of general interest from those of mere local weight, transient value, and less worthy appeal;

"(2) To strengthen the impressions gathered from the regular texts by this additional viewpoint;

"(3) To furnish a practical and permanent field for the application of facts learned in his daily texts, and for the enlargement of that field in after years;

"(4) To add interest to his schoolwork, to sharpen his insight and intellectual 'attack';

"(5) To cultivate his ability to express in good oral English a full, spontaneous, and accurate acount of what he has read with interest;

"(6) To open for the teacher an avenue for inculcating many principles of morals, patriotism, initiative, civic pride, etc., which might not emerge from the formal daily recitations."

Furthermore, a study is made of the recent war, "inventions, hygiene and sanitation, advancement in medical science, social betterment, politics, municipal affairs (especially of our own city), etc."

It does seem that if all the above are the purposes and scope of this study, it alone would nearly fulfill the requirements of an efficient school system, to say nothing of all the other work,—and only ten minutes one day a week. There are nearly five days remaining, would it not be better to say, let these five days help out the ten minutes rather than to say the ten minutes, the five days?

However, it makes no difference what the nature of the criticism is, or who makes it, the Nashville School system has ascribed a great value to the teaching of current events which it is wise enough to see, and has set up an aim and a goal toward which it is striving, all of which could be followed

with safety by the majority of superintendents in this country who are foolish in their own "intelligent ignorance" of what constitutes a real elementary and secondary education. No doubt Nashville is accomplishing a great work along this line and her results are most remarkable. The greatest possible criticism is, more time should be devoted to any course, than is being devoted in Nashville, no matter what the subject is, that does for the pupils what the course in current events does for them in Nashville.

The commendable features of the reports quoted are,—the value and real worth of current events teaching are recognized by all; the zest and spirit in which the work is done and the intensive interest of the majority of pupils testify to the great results accomplished in spite of the small amount of time devoted to the work; the outlines they have designated and the aims and goals set forth when put together, give the true aim and method of what should constitute good teaching in this work; and to conclude, if the many superintendents who read these reports and the work of these cities quoted, instead of criticising would do as efficient work with current events as these, they are to be congratulated.

It does seem that more time than is now used in any city might be well used in the teaching of current events and of the things that are of practical value and of vital interest in our modern life. This will require greater classification and systematization of the work. No doubt, this will mean a change in our manner and method of teaching. And, whether we correlate current events with other subjects or whether we teach it as a subject by itself, it matters but little. But we should desire from this instruction, the development on the part of the pupil of the desire to read, to criticise and judge relative values of material read and so on. In other words, a pupil properly taught and versed in current events and the reading of daily newspapers, has the same ability of practical values and good judgment in that domain, the same as the trained teacher who has had the practical training and experience of being trained to teach under a competent supervisor and critic teacher. Furthermore, in addition to the correlated teaching of current events with all school subjects, the importance of current events teaching may be safely considered of so great a value by all superintendents that one period will be devoted wholly to this instruction each day by every teacher, at least, from the fourth grade on through the high school.

The real defect of present instruction and subject-matter in the majority of the city schools is well summarized in the following statement of Dr. Frank McMurry ("Elementary School Standards"),—

"But one may also judge the quality of instruction chiefly in terms of the activities of the pupils. In that case we ask: What are the children doing? Are they setting up objects of their own? Are they pointed and forceful in their responses? Are they selecting facts according to value? Are they exercising initiative in their study?

". . . The explanation is that teachers, supervisors of teachers, and authors of books on teaching have been so intently observing the procedure of the teacher that they have overlooked that of the pupils. Yet the center of gravity of the school lies in the pupil; and what he finally does determines the value of all the teacher's efforts. He, therefore, should be the primary object of consideration, rather than the teacher, and the quality of the instruction should be judged mainly in terms of his activity."

PROBLEMS OF NORMAL SCHOOLS

By John Alden Hancock, State Normal School, Mankato, Minnesota

The growing demand for larger efficiency and economy in educational institutions and systems is leading to further study of this group of problems. It is a group constantly increasing in number and importance. Success demands concerted effort, but will be less difficult to attain because of the special purpose of the normal school.

Each of these schools has an individuality easily discernable in its graduates. This is conditioned upon the personality of the executive and staff, their standards, and their point of view of their field of work. No complete list can be given since they vary with time, place, and the individual, but disposition, qualities of person and character, lines of ability, ideals of life, and scholarship are included.

How the school is to render the largest service to the state will differ with place and time. It requires keeping in close sympathetic touch with the constituency of city and county superintendents, graduates, and people. Ways and means for becoming well and favorably known over its contributing territory must be devised. With its laboratories, its libraries, and its experts with larger training and relative permanence of position it can take up the current educational problems and test them out to better advantage than can be done elsewhere in the state. The best results are not obtained by extreme policies of any kind.

The standards for graduation are often more or less vaguely in mind. There are instructors who insist that their work is limited to "teaching" their special subjects. This is to throw away many opportunities for valuable service. All of the training should converge in leadership and its development in the student. The need for it is imperative and foremost whether one is to be a class teacher, in charge of a department, or of a school, or of any institution. It includes power to grasp situations accurately, to see what should be done, and to develop thought, enthusiasm, earnestness, and persistence in securing results. It means skill in winning, organizing, and directing the work of the individual and group. It calls for uniformity of disposition, for initiative, judgment, resourcefulness, and self-reliance. Everyone coming in more or less daily touch with the student has opportunity to help develop and measure the qualities and powers concerned. Somewhere in the course the student himself should make a study of leadership.

In the great majority of instances the student's ideals and point of view of life call for no radical reconstruction. The two years of graduate work will as a matter of routine do much toward further growth and development. The most difficult group to train is composed of young women whose homes have so carefully shielded them from meeting difficulties and responsibilities. Socially they have been advanced beyond any attainments and worth of their own. They have not been taught to control their likes and dislikes to any great degree. It has been forgotten that daughters need skill and power to deal with their problems, which in time as are numerous as their brothers. A disheartening struggle often awaits such students if they "make good." The point of view of life must be changed. A truer

valuation of self has to be developed. Many of the group make excellent teachers. Others are eliminated—and appear later in the commercial college or church finishing schools.

A very interesting group of students is made up of earnest, genuine, nervous, "bright" young women. Their present welfare as well as their future necessitates some change in their point of view and in learning how to conserve their powers. They are very likely to overwork and are subject to many minor ailments. Careless or incompetent management of them to any degree throws them into the care of the nerve specialist for an indefinite time.

Overloading teachers is common in many localities. Few young women know how to protect themselves from this. The responsibility for the breakdown of the teacher's health is often the board's and superintendent's, and frequently her own. Three months' vacation is often necessary for the teacher to fully recover from the strain of nine months of work. To require early in the graduate course the study of hygiene and sanitation would probably not be a mistake. Housing in dormitories where supervision could be maintained by dean, nurse, and school physician counts for much. Requiring the young women to wear a prescribed uniform which includes protection for arms, neck, chest, and feet would help to establish health and check against the inroads made by the follies of fashion, wilfulness, and example. Men like Gulick have done much to expose the dangers of the medicine habit to which young women easily fall a prey. It is difficult to help students to appreciate the dangers, both mental and physical, to which nervousness exposes them. Certainly teachers have a right to their health but many of them do not develop much of an interest in it till its loss is threatened.

Allround sanity and success in dealing with school and community demand a keen sense of humor. This has often been crushed out or left to chance for its development. It remains to be determined how the serious, earnest, and often very religious young woman can be helped to develop this sense. Fortunately American people have had such teachers outside of school as Mark Twain, but "Tom Sawyer" is still banned from many homes and public libraries.

The point of view of religion in normal schools can not be left out of consideration. Protestant, Catholic, and Jew are all present. Which, in past centuries, has been most intolerant of the others is difficult for the student of history to say. In theory neither one is guilty. The faults of those long gone times were of the entire people. It is necessary to cease muck-raking the past and to begin to get acquainted with each other and with each other's point of view. Charles Lamb's remark that he could not hate people whom he knew is true of students and teachers also. Instead of stirring up trouble in the courts over the question of reading the Bible one or more days a week in the schools, suppose we give attention to the beliefs we have in common and to the resources of music, literature, painting, history, architecture, and psychology for solving the problem.

Ability to plan to meet the needs of the members of the class, or of the school, has already been mentioned with leadership. Making imitators of students is to invite failure. Both analytical and observational power is involved, the former to enable one to see the details of the situation before him, and the latter for noting the tendencies and habits of its dynamic elements. Power of this kind is involved in every other calling as well. It is a power to be called forth by the work of each instructor and here again are opportunities for judging of the fitness of the student for the work of teaching.

How can it be determined for what grade or grades the student should be specially trained? In the country school she must deal with

many if not all grades. There she has much need for a clear understanding of primary work. But the normal school student rarely is willing to teach in the country if she can help it. It would take more than two years to persuade her that it is much less than a calamity to have to work there. Fortunately the requirements for many grades overlap. Standards for dealing with this problem need much study and are very debatable. All critic teachers ask for the brightest of the student body for their work. Perhaps the most complex problems are presented in the primary and grammar grades.

Where should the student do her "practice" teaching and how much of it? Conditions in city and country schools are often so different from those presented for the test in the normal schools. Would not some combination of present methods be a great advantage? Locating the graduate where she can succeed from the first, keep her health, and grow professionally requires a large knowledge of people and conditions in contributing territory.

Who are unfit for the work of teaching? This question has already been answered in part. There is danger of being arbitrary concerning standards. Some students lack in force, due usually to health, some are wanting in ideals, and others are deficient in mental power. Certainly the problem is one that may well take the time of faculty meetings. In justice to both the unfit and the school the decision should be made at an early date. By the first half or two-thirds of the year the decision can be made by the coöperation of the teachers concerned with the work of the student. It may well be doubted if the student poor up to that time, ever rises much above mediocrity in teaching. She ought not to be inflicted upon childhood.

Should other than graduate courses for high school students be offered? This has been answered in both affirmative and negative. High schools develop now well and now poorly. Their teachers, principals, and superintendents change very frequently. The quality of the work done varies accordingly. There is a value in normal schools maintaining junior and senior high school courses in which the most promising ideas can be tested out for the suggestion of the high school workers and for standardizing their work. The larger experience and training of the normal school staff would make these courses of much service.

The organization of the graduate work is of necessity somewhat arbitrary. With increasing numbers of students pretty much every subject in each course must be offered each term or semester. Each subject is taught independently of other subjects offered at the same time, and is not of necessity in any immediate relation. The mental effects of this are disintegrating. Education should contribute to mental unity. Herbart saw this clearly a century ago, but we are yet far from organizing courses of study as they ultimately need to be. Perhaps the solution can be helped by faculty discussions of each instructor's work. Unity in the faculty could be promoted as well as unity for the common result,—the equipment of the graduate. The specialist left to himself is likely to become warped and moody and to lose his enthusiasm. He certainly needs to have his balance and proportion preserved as much as do the students.

It has long been customary to offer courses in "review and method in common branches." In practice this has resulted in very much review and very little method. Method, having been over-emphasized at one stage in the history of normal schools, is now frowned down by very many. We shall some day reach the saner medium as usual. The instructor's reason for so much subject matter is "that students seem so ignorant of his subject." And yet the incoming high school graduate received her training in these branches from normal

school graduates in all probability. Emphasizing subject matter has been the policy for more than a generation but improvement in ability to deal with the "common branches" does not seem to increase if one may believe what he hears. Does not this demonstrate the need of a new point of view and a reconsideration of these branches? Ought not these courses to deal with the psychology, pedagogy, history, and hygiene of each branch? Sufficient review of subject matter would in all probability be secured incidentally by this policy. After six or more years of study of any given subject in the grades and four years of further growth and development in the high school, power in these branches ought not to be so little in evidence. Would it not be well to find out just what the difficulties are? Why should exactly the same amount of time be given to each branch? It is an easy way of disposing of an administrative problem, but no one pretends that their values are the same, or that these values foot up the same in amount. History, geography, and drawing are growing fields of knowledge, but that can not be as true of arithmetic or grammar. A careful investigation of this entire problem would be well worth while, otherwise we shall shortly have the same outcry against arithmetic and grammar that is now raised against algebra. Its critics are assuring us that it has actually no value whatever. Again it is the complaint and point of view of the extremist.

Two points of view of fields of knowledge have grown up. One of these regarded each field as, if not complete and finally organized, to be completed and then transmitted to posterity in that form. There have been few philosophers who have not tried to say the final word. It is not surprising that emphasis should be placed upon proof as the final culmination of thinking power. However much this point of view has been discredited much of the current practice in teaching persists in the effort to leave the subject as complete,—finished. This results in fixing habits and in checking readjustment,—in other words checking or preventing progress. So rapidly do conditions of life change that readjustment of habits of many kinds is quite necessary. No field of knowledge exists but is growing through the solution of its problems, and the solution of those of to-day raises more for to-morrow.

Texts have devoted much space to discussing ways and means for the formation of habits of thought and action. The equally important problem of keeping habits under control, of modifying and changing them, and how they relate to scientific method has received little treatment. The importance of this to progress finds illustration in the frequency with which invention and competition have wrecked a trade or a business. The history of every body of knowledge details explanations once sufficient, guiding laws and principles that can no longer guide, superstitions that were once science, mythology that was once good theology, and so the possibility of final systems does not exist. Present day conditions and institutions of all kinds are the results of long periods of growth and development and must be understood as at best but relatively temporary. Reconstruction, reorganization, readjustment of the old to meet the needs of the present and future are in constant demand. Can teaching help develop this ability?

Systems have been organized after one has met and solved the problems of his field of work. They have come through growth and must always be held subject to amendment. Slavishly adhered to they lead to stagnation and the loss of enthusiasm. The fossilizing of an able faculty may come about so slowly as to be imperceptible to those in the midst of it. It is a real danger to which the best

are exposed. The fossil can not always be disposed of at will. He has his friends who will help him fight for his existence. It is better to keep the fossil alive and growing. He is rarely unwilling. The solution of this problem together with that of faculty harmony lies in developing an interest in the growth of each member's field of work. There is nothing so stimulating as research and discovery. The faculty member needs for this the stimulating and sympathetic council of the executive, the opportunity for reporting and discussing his results with his colleagues, and publishing his results for the benefit of the school's constituency in the school bulletin. Encouraged to be always a learner, he will realize better what confronts his pupils and how to deal with their difficulties. How to teach has been the great theme of many educators. Emphasis is now changing to the inquiry, how do children and people learn? Teaching is to be modified accordingly. This theme is not alone one for study in the classes in pedagogy and psychology; it raises the whole problem of keeping the entire faculty in touch with the scientific teaching of their subjects. The development and application of scientific method is not confined to the "sciences." Its application to other fields whether in primary or what not stages of growth is imperative for progress.

Can we ever arrive at scientific "marking systems?" Do we need exact marks,—percents directly or indirectly? Perhaps the improvements in the Binet-Simon tests may be the solution of the problem. Thus far the best efforts in marking have had to be more or less arbitrary. Any measurement of ability must determine power to grasp situations, to analyze them accurately, to observe accurately the forces at work in the problem, to utilize past experiences for any suggestions, laws, or principles serviceable in dealing with them, and if necessary to generalize a new guiding theory for overcoming the difficulties confronting one. If the candidate is a normal school student, power not only to hold attention on the topic at hand, but also to divide attention and to deal with a number of things, is important. How many possible grades should there be? Is "passed" or "not-passed" sufficient? If three or four or more grades are determined, e. g., "A," "B," "C," "D," and "E," just what should the value of each of these be? To say that each may be expressed in terms of percentage is to evade the question. Judgment concerning these problems needs to be thought out.

The relation of the academic and the training departments is frequently artificial. Where the executive is the immediate head of both departments more satisfactory relations have existed. This has meant that he does less clerical work and has a larger office force. His personality being the most important one in the institution, as well as the most influential, should be the one most deeply impressed upon the graduate. This result is further secured where he is in personal charge of some class in which he meets all of the seniors often enough to know them well. His personal acquaintance with them in the training department and class room will add largely to the value of his judgment in locating them for their future work.

Other problems there are in large numbers but the ones so much needing large study are those bearing on problems of teaching and learning,—the great purposes for which normal schools have been built.

THE FUNCTION OF THE TRAINING SCHOOL

By George H. Shafer, State Normal School, Fairmont, West Virginia

Pedagogical literature has become so voluminous in these days that it is impossible for any one to keep up with it, and yet one of the most vital problems seems to have been almost entirely neglected. In going over this literature one seeks in vain for anything like an adequate treatment of the problems of the training school. This seems to indicate a lack of interest by educators in general in an institution which is of the utmost importance in the administration of education. One would think that, at this time, when vocational training is in the forefront of educational thought, the idea of a training school for teachers should no longer need to be defended, yet one reads with a feeling of chagrin the almost pathetic plea made by the head of the department of education in one of the most prosperous state universities in this country for the training school whose existence was threatened by the failure of the board to appropriate funds for its maintenance.

Years ago it was possible for a medical school to be maintained in isolation from large centers of population where there were no hospital and clinical facilities, and it was possible to do this with the entire respect and confidence, both of the medical profession and of the public in general, but the last twenty-five years have wrought a great change in this respect. Our concept of an efficient medical training has passed through a rapid process of evolution. Many of the smaller medical schools, even in cities of from one to two hundred thousand population, have gone to the wall because their graduates could no longer hold the respect and confidence, either of the medical profession, or of an increasingly intelligent public; and to-day it would be a scandal to maintain a medical school without an abundance of clinical facilities. But this is only a simple illustration of the operation of a fundamental principle which is applicable to training in every profession or occupation which involves both science and art. Law schools make much of moot courts, and that law school which is located in a large center, where many varied and important cases are disposed of, is indeed fortunate. A department of agriculture in a college or university without a farm would be held up to ridicule; an engineering school without machine shops and mechanical appliances would be almost unthinkable, and the time has come when the idea of a normal school without an adequate training school is just as ridiculous as the idea of any other professional school without its appropriate laboratories and clinics.

Psychology teaches us that it is the function of the nervous system, and especially of the cortex to connect sense organ with muscle. Evolution teaches us that the very structure of the cortex has been built up as a result of the demand to make this connection. The end of knowledge is action, and until the pathway between impression and expression has been opened, knowledge cannot be vital. It is the sensation that returns as the result of the act that clinches knowledge and makes it vital. The first demand upon the organism is a demand for action. Historically, art comes first. Science grows out of art, and in turn culminates in art. There is a great difference between

knowing about a thing and knowing a thing. In the classroom and in our reading we learn about things. In the clinic, on the farm, in the shop, in the training school, we learn the things. Real knowledge gives confidence, ability, assurance. Mere knowledge about things leaves us timid, uncertain, and halting. Of course, it is true that knowledge about things will help us in gaining knowledge of things, but the first in order to function economically must be simultaneous with, or must follow closely the second; in other words, science, if it is to function economically in art, must come in when the need for it arises. If the science of teaching is to culminate in the art of teaching, if student teachers are to gain a knowledge of teaching as well as a knowledge about teaching, and this is to be done efficiently, the science and the art of teaching must go hand in hand. Here, then, we find the principle which not only justifies but demands a training school for every normal school and for every department of education in college or university. But such a training school, if it is to meet at all adequately the demands here indicated, should first be a *normal* school with *normal* pupils, under *normal* conditions.

In dealing with the individual student teacher the ultimate end of the training school should always be kept clearly in mind. The ultimate end of the training of teachers is the education of the children of the State. The supreme concern, the conclusion of the whole matter, is the welfare of the child. The school exists for him; the entire machinery of elementary education exists for him, not only for the child of the immediate training school, but for the children of the State; so that it is the function of the training school, not only to unfold the individual capacities of prospective teachers in line with the most approved practices and to inspire them with something of the ethics of school craft, but in conjunction with the other departments of the normal school to detect and to eliminate the unfit. The training school ought never to tolerate any individual as a student teacher whose influence, whether because of mental incapacity or moral perversion, or for any other reason, would be likely to jeopardize the welfare of the children whose education a normal school diploma would give him a permit to direct. This needs emphasis, because in the training school we are dealing with the individual student teacher at close range, and in our interest in his immediate success, it is sometimes difficult to keep in view the proper perspective. And this elimination of the unfit cannot in any sense be regarded as a hardship to those who are eliminated, for in this respect the training school is acting in accordance with a function that is common to all schools, namely: to help the student to discover himself, and to shunt him from a course which would mean an expensive and ignominious failure for himself and a double loss to the community.

Again, the training school should perform the function of balancing the theory of the educational department by practice. One of the severest struggles of all sciences in their evolution has been to get away from a closet philosophy, and later on to gain their independence of the sciences from which they sprang, and upon which they are compelled to draw largely for their guiding principles. Now the science of education depends for its guiding principles upon biology, sociology, and psychology, but the principles of these sciences cannot be applied to the teaching process without adjustment. Our inferences from the sciences must at every point be tempered by practice. Pedagogy must establish its own principles. Other sciences may suggest lines of advance but the ultimate principles must be wrought out under actual school conditions. Where pedagogical theory is worked out in a college or normal school department of education

which is not in close contact with actual school conditions, there is the almost invariable tendency to develop extravagant and dogmatic theories, which are so ethereal that they are absolutely disconcerting to the individual who comes into actual contact with real conditions. It is partly for this reason that prospective teachers in the past have often derived very little real help from their undergraduate professional courses. Such young people have gone forth from our institutions convinced of the simplicity of the problems of education, inspired with the zeal of the reformer, and confident in their own kind of theories, only to find their cherished theories breaking down, one by one, under actual conditions, and disillusioned, they have thrown up their hands and have asked with the skeptics "Is there a science of education?'

It is very well for us to conceive ideal conditions. We must occasionally stand on the hilltop and look into the promised land. We recognize fully the significance of ideals; we must have them to make progress possible, but we must be sure that they are ideals which it is possible at some time for real beings, under real conditions, to realize. It is very well for one to hitch his wagon to a star, but it is also well for him to keep up a rather intimate communication with mother earth, at least until he is quite satisfied that he is ready to put on the garments of white, and cease to be an immediate contributor to the world's progress. There is no safer way for an educator to keep his bearings than by constantly checking up his theory under actual school conditions. This idea is fully appreciated in other professional schools. The medical school seeks the most successful practitioners to fill its chairs, and expects them to keep up their practice. The law school seeks the lawyer who is right in the forefront in practice, because these men are each day brought up hard against actual conditions, so that the function of the training school is not only to train student teachers, or to work out theory in practice, but also to keep heads of educational departments from severing their cables and swinging too far into the realms of the unknown.

The training school should give a certain tone, a certain standard, to the educational work of the community and of the district for which it exists outside of the direct influence which comes to the work of the trained teachers which it sends out. It may be expected that the training school should embody in its equipment—its buildings, its playgrounds, its gardens, its hygienic appliances, its library, its reference books and materials for teachers, as well as in its curriculum and methods of teaching, safe standards to be followed. It should be progressive so far as to incorporate in its material equipment the most effective modern appliances. Its course of study and methods of teaching should constantly check up with the biological, sociological, and psychological principles of education, as corrected by experimental pedagogy. This last requirement demands a well equipped corps of critic teachers and supervisors. With this equipment, the training school will command the confidence and respect of the district, and will be bound to effect the tone of every single school within its territory.

I have now pointed out in broad outline four general functions of the training school:

1. The training school is a laboratory for the initiation of student teachers into the art of teaching, by giving them actual practice in the light of modern theory, and under the guidance of skilled teachers.

2. The training school should assist the student to discover his own aptitudes and to find the place where he can most fully realize himself, and it should eliminate those who are manifestly unfit.

3. The training school should perform the function of keeping educational theory well balanced, so that there may be the least possible loss in the application of theory to practice.

4. The training school, by setting up professional standards and by keeping abreast of the times, should be a source of inspiration and of helpfulness, and its influence should be manifest in the tone of all educational work throughout the district which it serves.

BOOK REVIEWS

Jewish Life in Modern Times. By ISRAEL COHEN. N. Y., Dodd, Mead and Co., 1914. pp. xiii + 374.

Mr. Cohen's work on "Jewish Life in Modern Times" is by far the best exposition of the inner life of the Hebrew race that has been written up to date. The style is pleasing, the attention of the reader is held to the very end, facts and figures are presented in lucid form, and the wealth of detail which is set forth makes this book truly scholarly.

At times it seems as if we were under the personal direction of a guide who leads us through the Ghetto and shows us every phase of Jewry, even to the smallest item. Now we are in the kitchen of the Jewish housewife where we observe her going about her intricate duties; now we are in the Synagogue where we attend divine service; or we watch the Jewish father perform the many rituals peculiar to his religion; or we sit at the bed-side of the dying Hebrew, and attend his funeral in solemn love and reverence. And all this is presented so skillfully and in such a scholarly manner that we may well declare, without exaggeration, that Mr. Cohen's work forms a permanent contribution to the literature of races.

The book is divided into seven parts. The first is devoted to a "General Survey," while the rest take up the "Social," the "Political," the "Economic," the "Intellectual," the "Religious," and the "National" aspects of the Jews, in the order named.

Jewish life, we are told, is extremely complex, for although it is fashioned by religious observance it is also diversified by political forces; and these latter are far from being homogeneous as is the former. Nor should the political forces be minimised. For it must be remembered that the thirteen and a half million Jews are scattered over the entire face of the globe, where their destiny is subject to the social pressure of the people in whose midst they live, and this pressure is directly proportionate to the ratio by which those people outnumber the Jews.

The Jews of any land reflect the culture of their adopted country, but when that culture is base and crude, as in Russia, they entrench themselves in their religion, and cultivate the Talmudic Laws and traditional customs. And though the Jews of Western countries are modern in life and thought, they manage to preserve enough of their own characteristics to insure the security of the race. The basis of the Jewish community is public worship, which, to be held at all, demands the presence of at least ten adult male members. The secret of the continuity of Jewish life is to be found in the gregarious instinct of the Jews. Were it not for the communal spirit with which they are so strongly imbued, they would not have been able to resist the disintegrating forces of the dispersion—forces which have been in operation two thousand years.

"Jewish life in the eastern countries has all the intensity and distinctiveness of the life of an independent nation" (p. 34). They have their own language, their own literature, their own holidays, and even their own fashion of dress. Two other features that distinguish the Jewish community of the East from that of the West is the homogeneity and the poverty which characterize the former. Moreover

the Eastern communities are cramped and delimited by law; the Western spring up voluntarily. These latter also contain two kinds of Jews—the native born,—they whose ancestors settled many years ago; and the foreign element,—people who constantly immigrate from Russia, Rumania and Galicia. The Ghetto in Eastern countries is a sign of political oppression, in Western lands it is the outgrowth of the poverty of the immigrant Jews. As soon as the Ghetto dweller has improved his material condition he moves into a better neighborhood.

The family is the basis of Jewish strength and union. It has been hallowed by holy Writ, and the Biblical command, "Be fruitful and multiply" has been carried out scrupulously in all Eastern communities. In the West, however, the size of the Jewish family has greatly diminished.

The chapters on the external and internal features of Jewish home life abound with a wealth of information. They should be of particular interest to students of sociology.

No race possesses more average ability, thrift, industry and application than the Jews and yet no race is more impoverished than they. The reason is to be found in the remorseless persecution to which the Jews are subjected in Eastern countries. Yet the spirit of union is so firm in these people that the well-to-do Jews have adopted the most modern methods for the relief of their poor brethren. Indeed, Jewish philanthropy is international in its scope. "The most important distinguishing feature of modern Jewish philanthropy," says the author, "is the solicitude and munificence devoted by the Jews of the West to the aid of their harried co-religionists of the East" (p. 85).

Jewish morality forms an important chapter in any work. In this connection the writer presents statistical data proving that the rate of criminality in Jewry is lower than among the general population. Moreover, Jewish criminality, such as it is, is largely determined by economic conditions. This is demonstrated by the nature of the crimes. The majority of them belong to such categories as fraudulent bankruptcy, the evasion of Sunday laws, or military service in countries like Russia and Germany. Very few are the crimes of violence committed by Jews. Though the Jews of Russia form 4.13 per cent of the total population they contribute only 2.97 per cent of the criminals in that country. In Hungary they form 5.02 per cent of the population and contributed only 3.36 per cent of the total convictions for the period of 1906-8. Similar figures obtain for Germany, England, France and America. The figures presented certainly justify the author in concluding that on the whole "the delinquency of the Jews consists mainly of breaches of the laws and regulations governing the business pursuits in which they are engaged, and generally corresponds to the ratio by which they are represented in them. It . . . is eminently free from the vice and brutality that account for the grossest crimes in the world of human iniquity" (p. 98).

Since the animus of the book is to prove that the Jewish race is on a par with the best of civilized races, that it ought to be kept intact, and that its preservation can be accomplished only by saving it from the disintegrating influences of modern times—influences that make themselves felt in such forms as intermarriage, apostasy and a declining birth-rate, one would expect the author to show that the Jews possess that element which alone is able to preserve the unity of a race, namely, a self-sufficient social life. This he fails to do. The fault, however, is not his. The fact is that Jewish culture and tradition make no provision for a self-sufficient social

life. And this is more responsible than anything else for the falling away of the young from the faith of their fathers.

Turning to the political aspect of the Jews we find that the Russian Government still has the distinction of being the hellhound of persecution. The bondage there consists of laws which rob the Jews "of all liberty in the choice of domicile and occupation." The Pale of Settlement to which the Government banished the Jews in 1769 has been narrowed more and more each year, so that the tightening of the "iron ring" from without and the instigation of pogroms from within has made the six million Jewish inhabitants veritable victims of the Pit and the Pendulum. The small percentage who are allowed to dwell in any part of the empire is confined to discharged soldiers, merchants of the first guild, university graduates and licensed mechanics. But none of these are permitted to retain their grown-up children with them unless they too belong to one of the four classes.

The fate of the two and a half million Jews in Rumania is no better. There, too, they are subject to much hardship. Though the Jews in Germany enjoy civil liberty, they are still exposed to discriminations which are the more painful in that the victims belong to the intellectual and therefore more sensitive class of people. The system inaugurated by Frederick William III whereby every apostate was rewarded with a bonus of ten ducats "is continued in another form by the German Government to the present day, for no Jew can aspire to a position in the civil service, or to an ordinary professorship in a university, or even to a commission in the army" until his blemish has been washed away by the waters of baptism (p. 295). The Jews enjoy full civil liberties in England, France, Italy and America. In these countries they have contributed many eminent men to public service. A rich list is given.

Jews are found in every occupation and profession. If the number engaged in business is altogether out of proportion it is due to the fact that nearly half the total number of them in the world are forbidden to enter the field of agriculture and to pursue the liberal arts. Mr. Cohen shows clearly that the enormous wealth with which the Jews are credited is purely fictitious. The fact is that the vast majority of them, especially those in Russia, Rumania and Galicia are steeped in abject poverty.

The section devoted to the intellectual aspect of the Jews is very rich and up-to-date in information. The author is of the opinion that there is a distinct Hebrew literature. The only drawback is the lack of a universal language. This defect can be remedied only by the establishment of an autonomous government in Palestine. A historical and critical analysis is then made of great Jewish writers, dramatists, poets, historians and artists. The contribution of the Jews to general literature, to journalism, philosophy, science, mathematics and medicine, as brought out by Cohen, shows them to be a really gifted people. Here, too, the author displays a wide range of information, though it must be confessed that his acquaintance with eminent American Jews is not as wide as it might have been.

The religious aspect, beginning with an exposition of the organization and administration of the Jewish Church, passes over to the forms of faith and methods of observing the Jewish ritual. There are very few sectarian differences. Indeed, there are only two forms of Judaism—orthodox and reformed. The fundamental distinction lies in the fact that the orthodox Jews still entertain the hope of a of exile, whereas reform Judaism "proclaims that Israel is not in exile, ... but that he has been dispersed to discharge a mission, to spread the principles of truth and justice and to be a model of righteousness unto all the nations of the earth." This doctrine,

declares the author, "stands in ironic contrast to the situation in Russia, where the Jews have been settled nearly two thousand years and have shown greater fidelity than their brethren to their faith, but have not made the least impression upon the moral perversity of their inhuman rulers" (p. 287). Incidentally Reform Judaism comes in for a just scathing at the hands of the writer. "That the Reform movement has failed to arrest the decay of religion in Jewry is a fact that will readily be admitted even by its leaders," he declares. In this respect I think Mr. Cohen is quite right, for it is still a question whether Reform Judaism is not after all a stepping stone from Judaism proper to Christianity.

The author finds that the drift from Judaism that is now going on throughout the world is one of the most disquieting features of Jewish life. This gives rise to the Jewish problem. The mere granting of civil liberties to the Jews will lighten the material but not the spiritual burden of Israel, for statistics show that precisely in those countries where Jews enjoy a comparative large number of such liberties they desert their faith in greatest number. England, Germany, Italy and France furnish a larger proportion of Jewish baptisms than cruel Russia. The all-impelling motive of this apostasy is the desire for equality of opportunity in the competition of life. Hence thousands of Jewish parents in Germany baptise their children in infancy in order that the latter may find their road to worldly success unimpeded by the prejudice of anti-Semitism (p. 301).

Naturally this gives rise to an interesting sociological problem: what effect is such wholesale proselyting—spiritual prostitution, we might say—apt to have on the moral tone of the nation where it is most in vogue? Does not the man who changes his heavenly faith for a worldly end show himself thereby to lack something in the moral gear? If one can set aside ones ancestral obligations with no qualm of conscience does not that pave the way for the subsequent setting aside of living obligations in the interest of the selfish ego? Mr. Cohen does not discuss this. We hope somebody will.

At this point the work narrows down to the dual proposition: assimilation or conservation. The Ghetto has been the conserving force in times past, but with the spread of intellectual emancipation even the Ghetto is breaking down as a conserving power. There is only one solution to the problem, therefore, and that is Zionism. To this plea the last chapter of the book is devoted, and though the reasoning pursued here, as throughout the whole work, is calm and scholarly, it nevertheless fails of convincing. But this is a minor matter. The book contains excellent illustrations and a good bibliography.

Hartford, Connecticut. G. A. Feingold.

The psychological methods of testing intelligence. By William Stern. Translated from the German by Guy Montrose Whipple. Baltimore, Warwick and York, 1914. pp. x + 160.

The value of this translation can hardly be overestimated. Although the monograph originally appeared in 1912 there is nothing of more recent date which gives such a logical, concise discussion of the problems of intelligence testing. At the same time the author's style is such that the lay reader readily finds orientation in this field.

The question of the nature of intelligence is first treated and the author finally resolves it into "general mental adaptability to new problems and conditions of life." Keeping this concept in mind he next shows that single mental tests are insufficient for diagnostic purposes and that what we need is test series which must be wisely selected. They must also be such that particular findings can be

united into one resultant value which will show the grade of intelligence. The two methods which are most promising Stern feels to be the Age Gradation Method of Binet and Simon and the Method of Rank Correlation of the Pearson School. Each has its advantages and disadvantages.

Stern then analyzes the Binet-Simon tests carefully, emphasizes the necessity of proper technique, discusses the various methods of expressing mental age and suggests the use of a "mental quotient" which is the ratio of mental to chronological age. Then follows a comprehensive survey of results so far obtained by the use of the scale. Comparisons are made for nationality, sex, environment and class as differentiating factors. The correlation between pedagogical age and mental age is also carefully analyzed and shown to be negative. The work on defectives indicates that they finally reach a state of complete mental arrest. The significance of a certain amount of retardation differs at different ages, and for an evaluation of this difference the author again advises the use of the "mental quotient." Finally he takes up the possibility of reorganization and improvement of the tests themselves and suggests the use of parallel series.

The method of Rank Correlation can be applied only in those cases where we are dealing with a relatively homogeneous group. This is in distinct contrast to the heterogeneous groups which may be handled by the Binet-Simon scale but the results obtained by the Rank Correlation discriminate much smaller differences in intelligence than is possible by the use of the Binet-Simon scale. The correlations of the rank order of subjects on various tests can be worked out easily and accordingly, as the correlation is high or low, it is assumed that the capacity operative in the tests depends upon the common factor of general intelligence. Stern points out that too complete assumption of this theory may lead to the use of a group of tests so closely related that they test but a small portion of the general intelligence. Therefore a criterion of the tests must be sought in the teacher's estimate. But the teacher's estimate itself must be controlled and verified. Only when two independent ratings made by the same teacher upon the group of pupils have a high coefficient of correlation can the series be used as reliable. The correlation between school rank and estimated intelligence is also dealt with but the indications are not promising.

The discussions, although somewhat neglecting important studies made in this country, raise most of the questions which are still confronting workers in this field, criticize the various contributions justly and open new avenues for future investigation. One regrets, however, that none of the author's investigations are reported in this monograph.

Clark University. FLORENCE MATEER.

BOOK NOTES

The earth; its life and death. By ALPHONSE BERGET. Translated by E. W. Barlow. New York, G. P. Putnam's Sons, 1915. 371 p.

The chapters are on the birth, age, form, magnitude, mass, movements of the earth, gravity, rhythmic movements of the crust, deviations of the vertical, seismic phenomena, magnetism, radioactivity, rhythm of oceans, tides, waves, circulation of the earth, marine and atmospheric, displacement of the pole, pendulum measures, the attack and defense of the continents, the old age and death of the earth.

The modern city and its problems. By FREDERIC C. HOWE. New York, Charles Scribner's Sons, (c. 1915). 390 p.

This work contains twenty-four chapters, the chief of which are the city, ancient, mediaeval and modern, American, the city and the state, municipal home rule, the charter, municipal administration in Germany, Great Britain, its relation to the public service corporation, municipal ownership, city planning here and in Europe, police, fire, health, the city as a social agency, the housing problem, recreation and leisure, the budget, new sources of city revenue.

Commercial education in public secondary schools. By F. V. THOMPSON. Yonkers-on-Hudson, World Book Company, 1915. 194 p.

The author treats present conditions in education for commercial life, school organization and teachers, the general high school and commercial education, three investigations and what they mean, constructive proposals, commercial high schools and commercial courses in high schools, with an appendix containing letters from New York business men and illustrative material used in the Boston investigation.

Dramatization: selections from English classics adapted in dramatic form. By SARAH E. SIMONS and CLEM IRWIN ORR. Chicago, Scott, Foresman & Co. (1913). 95 p.

We have here practical suggestions for the dramatization of high school classics. The authors believe that dramatization is one of the most successful of all devices for vitalizing the work of the English class and that the imagined difficulties vanish on nearer view, or else become, on working out, a stimulus to invention. Under Purpose and Method we have the Psychology, Pedagogy, and Types of Dramatization, then Ways and Means, Problem of Staging, including Setting, Costuming, Lights, Characters, treated with reference to the novel, short story, epic and ballad. Then come Specimens and Bibliography. We have here a four-year course with six items each in the first and second year, five in the third, and five in the fourth year. The work of each of the four years is also printed in separate pamphlets.

Psychology of high-school subjects. By CHARLES HUBBARD JUDD. Boston, Ginn & Co., (c. 1915). 515 p.

The more important chapters discuss psychological problems in mathematics, the psychology of space, analysis of geometry, of higher abstraction, reorganization of mathematics, psychology of language,

the English problem and the psychology of its course, foreign languages, opposition between the practical arts and language, manual skill, industrial courses, science, fine arts, history, generalized experience, teaching students to study, with a final chapter on the general problems of secondary education.

Everyday pedagogy, with special application to the rural school. By LILLIAN I. LINCOLN. Boston, Ginn & Co., (c. 1915). 310 p.

The author is an experienced superintendent and her book rather modestly discusses nearly a score and a half of topics such as the teacher, building, apparatus, physical comfort, morning exercises, arithmetic, reading, dictionary work, picture, spelling, language, poem, story, geography, history, nature study, drawing, writing, music, desk work, industrial work, recitation, play and discipline.

The appointment of teachers in cities; a descriptive critical and constructive study. By FRANK WASHINGTON BALLOU. Cambridge, Harvard University Press, 1915. 202 p.

A remarkable thing is that of seventy-three cities originally selected as a basis of this study, all responded except one. We are given here an interesting account of the evolution of the present appointive agencies, and then told much about the method of treating data, the significance of the subject, and what each type of agency does. In Chapter IV the eligibility qualifications and methods of determining them are taken up. Then comes the authority of boards, size, membership, committee organization, changes, method of selections, members and their term, this being based on twenty-eight cities. Chapter VIII treats the city superintendency, and the last chapter is a useful summary. The book is a valuable contribution to a very important subject.

The Young and Field literary readers. Book five. By ELLA FLAGG YOUNG and WALTER TAYLOR FIELD. Boston, Ginn & Co., (c. 1915). 384 p.

This is a book of heroes of all times and of all countries, from Perseus, Daniel, Regulus, Beowulf, Siegfried, Arthur, down to Florence Nightingale, Dr. Grenfell of Labrador fame, Captain Scott, who died in quest of the South Pole, etc. Five of them are in verse; nine by various authors deal with heroes of olden times. Then we have ten heroes of later times and fifteen stories making a cycle of the year. The book has a few illustrations.

Social and economic forces in American history. Edited by ALBERT BUSHNELL HART. Chautauqua, Chautauqua press (1915.) 523 p.

This book is made up of twenty-eight essays by different authors, edited by Professor Hart, who supplies a large number of articles. The following topics are treated: early New England life, social and economic conditions of Viriginia, life in the colonies, provincial culture, people of new France, causes of the revolution, state of society, results of the war, the middle region, the south, the far west, American social characteristics, southern sectionalism, the new spirit of '76, the art of living, and the intellectual life.

Changing America; studies in contemporary society. By EDWARD ALSWORTH ROSS. Chautauqua, Chautauqua press (1915). 236 p.

This interesting booklet contains the following chapters: the outlook for plain folk, the world-wide advance in democracy, falling

birth-rate, significance of increasing divorce, women in industry, commercialism rampant, suppression of important news, the middle west, the fever of the people, the reconstruction of democracy, state universities, society and culture.

American ideals, character and life. By HAMILTON WRIGHT MABIE Chautauqua, Chautauqua press (1915). 341 p.

The chief chapters in this work are, discovery and exploration, possessing the country, provincial America and literature, sectional and national literature, the American in art, school and college. university and research work, the American and his government, the country and the people. These interesting lectures are based on those given by the author, who was sent to Japan on the same Foundation as the first exchange professor or lecturer. In the course of six months he delivered nearly eighty addresses in Japan, Korea and Manchuria, without an hour of loneliness.

The ways of the planets. By MARTHA EVANS MARTIN. Chautauqua, Chautauqua press (1915). 273 p.

This very interesting book describes our relations to the planets, their origin, how the inferior planets seem to move, their path; then follow separate chapters upon Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, and the little planets and asteroids.

Manual of stories. By WILLIAM BYRON FORBUSH. Philadelphia, George W. Jacobs & Co., (c. 1915). 310 p.

This claims to be the most comprehensive book on the subject ever published dealing with value, kind, devices, relations of stories to play, use and character, the home, school and church story telling, etc. The list of sources claim to be unprecedented. The book is divided into two parts, How to Tell Stories, with fifteen headings, and The Bottle Story-People, with ten headings, with appendices on various topics connected therewith in ten headings.

Psychology and parenthood. By H. ADDINGTON BRUCE. New York, Dodd, Mead & Co., 1915. 293 p.

This voluminous author has given us here one of his most interesting books. In it he seeks to review and unify in non-technical language the findings of modern psychology which bear on the laws of mental and moral growth. Among the special topics treated are Importance of Environment, Suggestion, Secret of Genius, Intensive Child Culture, Laziness, Laughter, Hysteria, Menace of Fear. It is obvious that the author has on the whole drawn far more directly from life than from the literature which bears upon these subjects, with which there is no indication that he is familiar.

The parents' guide; a manual of child nature and nurture. Prepared by the Editorial Board of the University Society, with the assistance of Michael V. O'Shea, Dorothy Canfield Fisher and many others. New York, University Society, 1915. 2 v.

This is a book with a most impressive list of contributors and table of contents, and with very many new features. It is designed to be a handbook for parents, not a manual of housekeeping, although it contains good words on this subject. We are told that it is practical, simple, authoritative and complete.

The investigation of mind in animals. By E. M. SMITH. Cambridge, University press, 1915. 194 p.

The chapters are on protozoan behavior, retentiveness and habit formation, associative memory and sensory discrimination, instinct, homing, imitation, and the evidence for intelligence and for ideas.

American thought from puritanism to pragmatism. By WOODBRIDGE RILEY. New York, Henry Holt & Co., 1915. 373 p.

A brief notice of this book appeared in the American Journal of Psychology for July, 1915. Here we can only repeat that the heads of its chapters are as follows: Puritanism, Early Idealism, Deism, Materialism, Realism, Transcendentalism, Evolutionism, Modern Idealism, and Pragmatism.

Education for industrial workers; a constructive study applied to New York City. By HERMAN SCHNEIDER. Yonkers-on-Hudson, World Book Co., 1915. 98 p. (School Efficiency Series, edited by Paul H. Hanus.)

We have here a very interesting book, edited by Professor Hanus, who rightly regards Dean Schneider as the man who has worked out the most fruitful answer yet to the question of what kind of industrial schools are needed to meet the needs of the youth who are going to work early. The many papers, illuminating and extremely suggestive as they are, are not built upon any system, and the grouping is external. First, under The Need of Industrial Education, are treated its object, work in modern conditions and its classification, industrial education in the public schools. Then follows the problem in New York City, its numerical size and industrial scope. Finally comes the solution, education prior to gainful employment, corporation course in detail, the continuation school, and how to inaugurate both, with a final chapter of conclusions.

Life and work of Pestalozzi. By J. A. GREEN. Baltimore, Warwick & York. 393 p.

The first six chapters, of 115 pages, are biographical, beginning with Pestalozzi's early life, his expositional and teaching work. The second part is expository, describing his principles, the aim of education, concrete intellectual development, practical and moral education, while part three is documentary, with his letters, the pamphlet of 1800, the report to parents, etc.

Methods of teaching in high schools. By SAMUEL CHESTER PARKER. Boston, Ginn & Co., c. 1915. 529 p.

This text-book seeks to apply to high school instruction the same general principles that have so often and fruitfully been applied to the consideration of elementary school methods. It claims to be based on modern experimental psychology, particularly in discussing the aspects of learning, which have been subjected to extensive laboratory investigation, especially motor learning and practice.

The teaching of drawing; its aims and methods. By S. POLAK and H. C. QUILTER. Second impression. Baltimore, Warwick & York. 168 p.

The authors find that of all subjects present-day changes in drawing are perhaps the greatest. The old-fashioned copy and geometrical models are disappearing and the pupils are studying real things.

That means the old classical is giving way to the new natural. The authors' method is somewhat novel and is copiously illustrated.

The teaching of geography. By B. C. WALLIS. Cambridge, University Press, 1915. 221 p.

This handbook is a very convenient *vade mecum* for teachers on the scope of school geography, descriptive, transition, systematic, argumentative, historical geography, tradition, practical exercises, use of the globe, contour lines, examinations, geography room and apparatus, etc.

Camp and trail in early American history. By MARGUERITE STOCKMAN DICKSON. New York, Macmillan Company, 1915. 162 p.

This book consists of stories of treasure seekers, home makers, empire builders, Indian fighters, and liberty seekers. The first Americans, the fair god of Mexico, quest of eternal youth, an English sea king, the "city of Raleigh," a valley town in old New England, the story of New France, Peter the headstrong, seeds of liberty, are the chapter headings.

Elson-Runkel primer. By WILLIAM H. ELSON and LURA E. RUNKEL. Chicago, Scott, Foresman and Company, c. 1914. 266 p.

This book is based on the belief that interest of material is the most important factor and that the key-note of interest is the story element or a plot, and also that the child's delight in oral history should be utilized in the very first step of reading. So real stories rich in dramatic interest have been chosen.

The General Education Board. An account of its activities, 1902-1914. New York, General Education Board, 1915. 240 p.

This interesting volume gives the history of the General Education Board, its resources, expenditures, farm demonstrations, boys' and girls' clubs, secondary education, colleges and universities, medical, rural and negro education, with appendices and illustrations, particularly of the farm work done.

Songs and poems of the great world war. Collected and edited by Donald Tulloch. Worcester, Davis Press (1915). 298 p.

Mr. Tulloch has here performed a very helpful work of love in honor of the motherhood of Worcester and of the world. All the receipts from this book go to the British-Born Women's Association. Its several hundred poems are in English, and, as we might expect, a majority of them are from British sources.

Our friend John Burroughs. By CLARA BARRUS. Boston, Houghton Mifflin Co., (1914). 286 p.

This work contains a number of autobiographical sketches with some self analyses, and then discusses in successive chapters Burroughs' early writings, a winter's day at Slabsides, back to Pepacton, camping with Burroughs and Muir, and finally an appreciation. The work has a few illustrations.

The lesson in appreciation; an essay on the pedagogics of beauty. By FRANK HERBERT HAYWARD. New York, Macmillan Company, 1915. 234 p.

This work discusses beauty and its pedagogy, the principle of the first impression, music and poetry, positive and constructive preparation, the threshold of the lesson, the hour of appreciation, possibilities, pictorial art, drama and novel.

Historical essays on apprenticeship and vocational education. By JONATHAN FRENCH SCOTT. Ann Arbor Press, 1914. 96 p.

This book discusses the development of apprenticeship as a guild reform, the journeyman, the statute of artificers and its enforcement, apprenticeship as an educational system, the decline of the English system and the economic reasons for vocational education in America.

Health and cleanliness. By M. V. O'SHEA and J. H. KELLOGG. (Health series of physiology and hygiene.) New York, Macmillan Company, 1915. 301 p.

The body in health. By M. V. O'SHEA and J. H. KELLOGG. (Health series of physiology and hygiene.) New York, Macmillan Company, 1915. 324 p.

Health habits. By M. V. O'SHEA and J. H. KELLOGG. (Health series of physiology and hygiene.) New York, Macmillan Company, 1915. 216 p.

Making the most of life. By M. V. O'SHEA and J. H. KELLOGG. (Health series of physiology and hygiene.) New York, Macmillan Company, 1915. 298 p.

These illustrated and very attractive books are designed for texts and each topic has an epitome of the health problems involved, with review questions. It would be impossible in our limits to do justice to the scope or content of these books, for they touch physiology, personal efficiency, eating, sleeping, clothing, exercise, and the vast variety of topics involved in the problem of how to keep well.

Keeping fit. By ORISON SWETT MARDEN. New York, T. Y. Crowell Company, (c. 1914). 364 p.

This is a good popular book with several chapters on foods and diets. The author then discusses fatigue poisons, what to eat after fifty, out of doors, etc. In a word, the book consists mainly of the sprightly and well-informed talk of a well read and thoughtful man who is not scientific enough to lose his common sense, and apparently is not a physician but a hygienist.

Proceedings of the First National Conference on Race Betterment, January 8, 9, 10, 11, 12, 1914. Battle Creek, Mich., published by the Race Betterment Foundation. Edited by the Secretary. 625 p.

These proceedings are somewhat epochal in the fact that they represent the First National Conference, and also that they bring together some scores of addresses and discussions which are here classified under the heading statistical, general and individual hygiene, alcohol and tobacco, child life, sex questions, school, industrial, city, state and national hygiene, eugenics and immigration.

One man. By ROBERT STEELE. New York, Mitchell Kennerley, 1915. 394 p.

This is a novel, probably designed not to be so much the record of "a rake's progress" as to have a moral lesson by way of warning. It is very realistic and very detailed, but, in the humble opinion of the present reviewer, it would have been better had it never been written.

Modern essays. Selected and edited by John Milton Berdan, John Richie Schultz, Hewette Elwell Joyce. New York, Macmillan Company, 1915. 448 p.

This book contains nearly forty selected papers and essays from eminent authors, mostly living, and these are used as a method of teaching the rhetorical principle of exposition.

English spelling and spelling reform. By THOMAS R. LOUNSBURY. New York, Harper & Bros., 1900. 357 p.

This book still remains the best authority in English on simplified spelling.

Variation in the achievements of pupils; a study of the achievements of pupils in the fifth and seventh grades, and in classes of different sizes. By CHARLES HERBERT ELLIOTT. New York, Teachers College, Columbia University, 1914. 114 p.

Teachers' marks; their variability and standardization. By FREDERICK JAMES KELLY. New York, Teachers College, Columbia University, 1914. 139 p.

A comparative study of the intelligence of delinquent girls. By AUGUSTA F. BRONNER. New York, Teachers College, Columbia University, 1914. 95 p.

Educational guidance; an experimental study in the analysis and prediction of ability of high school pupils. By TRUMAN LEE KELLEY. New York, Teachers College, Columbia University, 1914. 116 p.

Individual differences in ability and improvement and their correlations. By J. CROSBY CHAPMAN. New York, Teachers College, Columbia University, 1914. 45 p.

The school system as an educational laboratory. By WILLIAM SETCHEL LEARNED. (Harvard-Newton bulletins, No. I, July, 1914.) Cambridge, Harvard University. 50 p.

Scales for the measurement of English compositions. By FRANK WASHINGTON BALLOU. (Harvard-Newton bulletins, No. II, September, 1914.) Cambridge, Harvard University. 93 p.

New Sloan readers, containing a complete course in phonics. Primer and First Reader. By KATHARINE E. SLOAN. New York, Macmillan Company, 1915. 2 v.

Muscular movement writing. Elementary and advanced books. By C. C. LISTER. New York, Macmillan Company, 1915. 2 v.